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Enhance the effectiveness and efficiency of government and NGOs disaster response— case studies of Wenchuan Earthquake and Typhoon Morakot

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**Enhance the effectiveness and
efficiency of government and NGOs
disaster response
—case studies of Wenchuan
Earthquake and Typhoon Morakot**

By

XIAO YANG

***A thesis submitted in partial fulfilment of the University's
requirements for the Degree of Doctor of Philosophy for PhD***

Coventry University

November 2017

Content removed on data protection grounds



Medium - High Risk Research Ethics Approval

Where human participants involved in the research and/or when using primary data - Staff (Academic, Research, Consultancy, Honorary & External), Students (Research & Professional degrees) and Undergraduate or taught Postgraduates directed to complete this category of risk.

Project Title

Enhance the effectiveness and efficiency of government and NGOs disaster response — case studies of Wenchuan Earthquake and Typhoon Morakot

Record of Approval

Principal Investigator

I request an ethics peer review and confirm that I have answered all relevant questions in this checklist honestly.	X
I confirm that I will carry out the project in the ways described in this checklist. I will immediately suspend research and request new ethical approval if the project subsequently changes the information I have given in this checklist.	X
I confirm that I, and all members of my research team (if any), have read and agreed to abide by the Code of Research Ethics issued by the relevant national learned society.	X
I confirm that I, and all members of my research team (if any), have read and agreed to abide by the University's Research Ethics, Governance and Integrity Framework.	X

Name: Xiao Yang.....

Date: 20/03/2014

Student's Supervisor (if applicable)

I have read this checklist and confirm that it covers all the ethical issues raised by this project fully and frankly. I also confirm that these issues have been discussed with the student and will continue to be reviewed in the course of supervision.

Name: Yung-Fang Chen

Date: 08/07/2014

Reviewer

Date of approval by anonymous reviewer: 09/07/2014



Certificate of Ethical Approval

Applicant:

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This is to certify that the above named applicant has completed the Coventry University Ethical Approval process and their project has been confirmed and approved as Medium-High Risk

Date of approval:

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Abstract

This research considers three main themes: disaster management and emergency planning; responses by governments and NGOs to disasters; and the humanitarian supply chain in the context of a disaster response. The aim of this study was to examine and explore how these three elements are brought together in order to enhance the effectiveness and efficiency of a disaster response. In particular, in the face of an increasing number of disasters, a speedily driven disaster response has becoming increasingly relevant in today's modern world. Emergency planning is an essential and fundamental framework for conducting a disaster response which is mainly carried out by governments and NGOs. Moreover, the humanitarian supply chain is crucial to enhancing the effectiveness and efficiency of a disaster response due to its function of managing and delivering relief goods and equipment to a disaster spot. In addition, through the use of two case studies, this research also examined the response by governments and NGOs to two significant natural disasters: the Wenchuan Earthquake and Typhoon Morakot.

The methods adopted in this research were semi-structured face-to-face interviews and case studies. In order to accomplish the research aim, interviews were conducted with key personnel drawn from the emergency and disaster management industries in China and Taiwan. The study participants were chosen because of their expertise in this area. In addition, two cases were analysed in-depth in order to provide a rich understanding of the context of the disaster response for both governments and NGOs.

This research found that both emergency planning and the humanitarian supply chain are crucial to enhancing the effectiveness and efficiency of a disaster response and will be so for many years to come. The key conclusion for this research is that enhancing a disaster response by including the humanitarian supply chain in an emergency plan is crucial, not only to enhance the disaster response stage but also to contribute to humanitarian relief. The findings from this research are not only applicable to China and Taiwan but can be transferable, and thus are highly relevant worldwide.

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Writing and completing this thesis was not only a process of absorbing knowledge but also self-exploration and implementation. Thanks to all the people who helped me.

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Chapter 1 Introduction

1.1 Importance of study

Over the past few decades, the threats posed by natural disasters have constantly grown, and these can affect human safety and social stability depending on the scale of the disaster (Blaikie et al 2014). The increasing number of disasters and the need for humanitarian support in recent years has raised the importance and urgency for serious research. According to current statistics, around 500 disasters occur every year, killing approximately 75,000 people and affecting over 200 million people, and that number is constantly increasing (Montz et al 2017). To reduce the size of the impacted population, it is necessary to develop a more effective and efficient response mechanism. This is because disaster response is the only phase of the disaster cycle that directly impacts on life or death. It is necessary to explore how to improve the effectiveness and efficiency of disaster response, and thus, this explains why this research is so important.

Disaster response is complex because various public and private sectors from the local to national and domestic to international can be involved (Coppola 2011; Haddow, Bullock, and Coppola 2017). In addition, the extent to which the economic development level of a given country and the capability and capacity of a state to quickly mobilize resources also challenges the effectiveness and efficiency of disaster response actions.

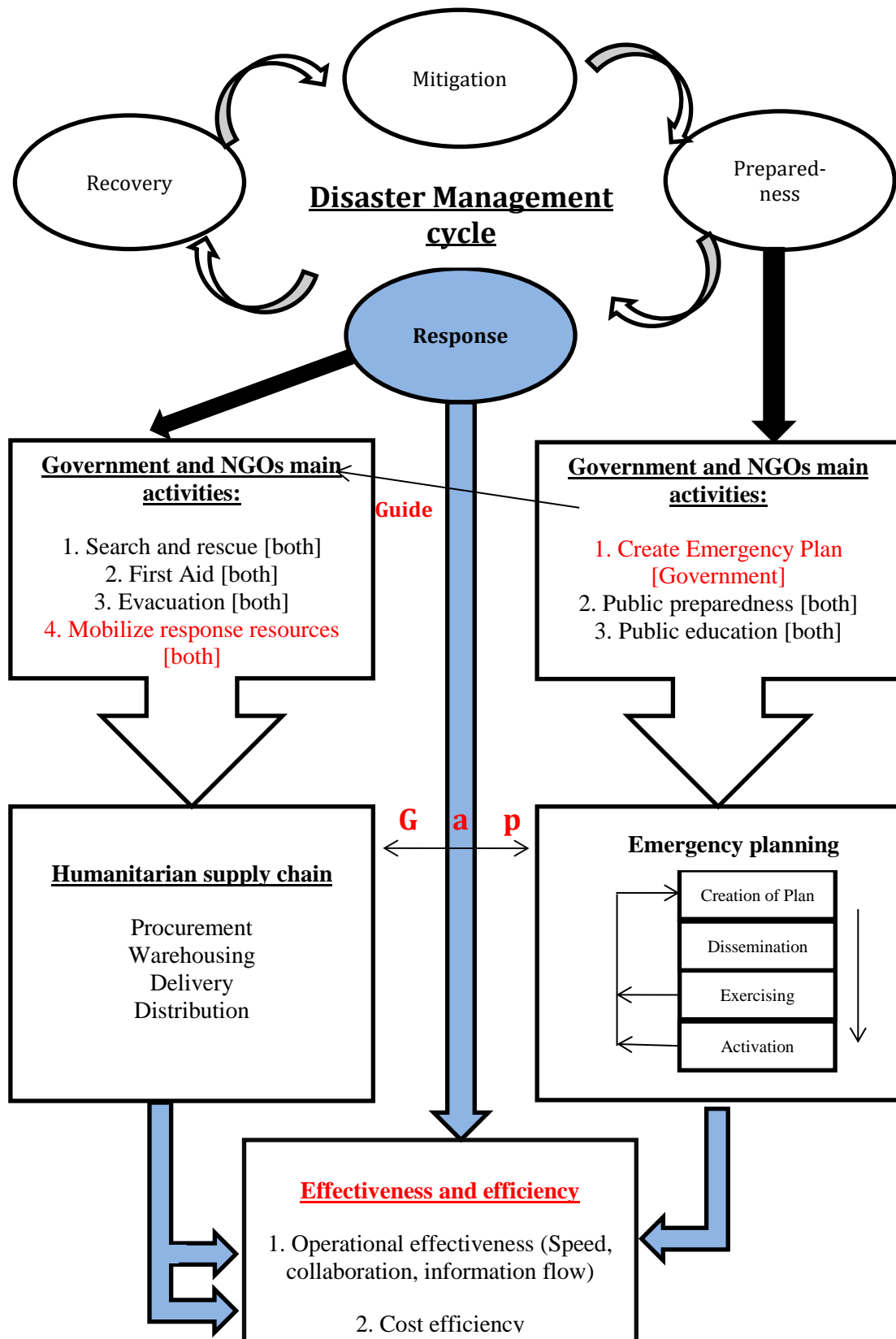
Furthermore, an effective disaster response is often limited by many factors which include economic, infrastructural, collaboration, the organizational perspective, information sharing, and personnel skills (Fischer 1996; Haddow et al 2017; Waugh and Streib 2006; Manoj and Alexandra 2007; Bharosa, Lee and Janssen 2010; Edwards 2009, Yi and Özdamar 2007). Yet emergency planning is the most important component among them all, as disaster response actions all need to conduct under an emergency plan.

This research examines the Wenchuan Earthquake (China) and Typhoon Morakot (Taiwan). The Wenchuan Earthquake caused enormous casualties and economic losses, with a total of 51 counties and 50,193 square miles in China being affected (Ellsworth 2013). In addition, it was the biggest earthquake since the establishment of the People's Republic of China. More significantly, for the first time, the Chinese government publicly acknowledged the positive response by NGOs to the disaster relief.

Typhoon Moroak also contributed to the Chinese government revising the regulations and acts related to disaster response. Given that 70% of Taiwan's natural disasters have led to human casualties and economic losses, Morakot was the largest over the past 55 years (Teng 2006).

These two milestone case studies highlight the importance of holistic emergency planning and the collaboration between government and NGOs. Yet lessons can still be learnt from these two disasters.

1.2 Conceptual framework



1.2.1 Disaster management cycle and Emergency Plan

The flowchart above showing the disaster management (DM) cycle illustrates the DM process and conceptually distinguishes the various phases of the DM cycle, which are the mitigation, preparedness, response, and recovery phases.

The DM activities in the mitigation and preparedness phases are aimed at initiating and strengthening the resilience and the capacities of those affected by a disaster and protecting their lives and livelihoods (Coppola 2015). The measures implemented during this phase are aimed at preventing or reducing the adverse impacts of disaster. In the response phase, on the other hand, the focus is on saving lives and preventing loss of property; whereas, in the recovery phase, the focus is essentially on recuperation and rehabilitation (Coppola 2015).

In fact, all the activities have to be carried out under the Emergency Plan (Alexander 2003) which is the essential guidance that the relevant authorities/ participants are required to follow. Therefore, it is vital to have a holistic emergency plan before the government and NGOs carry out their response, in order to enhance the collaboration and information flow between the government and NGOs.

In addition, the response phase, which is the only phase which is directly related to the survivors or the victims of a disaster, is the most complex among all the phases of DM. Therefore, it is important to enhance the effectiveness and efficacy of the disaster response phase in order to save more lives. Therefore, this thesis only focuses on the response phase.

1.2.2 Effectiveness and efficiency in disaster response

Efficiency is defined as using a variety of parameters which include improving output while minimising input (Zokaei and Simons 2006). This can be defined as the ratio between the level of inputs and the level of outputs (Fugate et al. 2010), the ratio of the resources utilised to the results achieved (Mentzer and Konrad 1991), or the ability to provide the desired product/service mix at a level of cost that is acceptable to the customer (Langley and Holcomb 1992).

In other words, efficiency is focused on the ratio between the output and input. The output in a disaster response is the primary goal of the disaster response to rescue the dying and limit any injuries (Coppola 2011). Once a disaster has occurred, in order to achieve this primary goal, the participant authorities have to carry out a search and rescue response immediately using a 'cost-is-no-objective approach' during the first 'golden 72 hours' (Kelly 1995). However, practically, the cost-is-no-object method to disaster response is unrealistic. The logic of this theory ignores that the economic sources of an organisation are finite. At the same time, while the price may not be seen as an aspect throughout an operation, the bills in the end will have to be paid via higher costs, a decrease in income, taxation, borrowing or printing extra money (McEntire 2014). Moreover, the expectations of a no-cost-limit disaster operation encourages several dysfunctional disaster management strategies. These include poor preparation resulting in a lack of resources when needed, under investment before a disaster because purchases can be made when needed, and in contrast, expensive or unnecessary procurement during a disaster (Kelly 1995).

Effectiveness is defined as the value proposition of the supply chain to the end customers (Zokaei and Simons 2006), the degree to which a goal is achieved (Mentzer and Konrad 1991), the ratio between the real output and the expected output, and the ability to achieve pre-identified objectives (Fugate et al. 2010). Whilst Davis and Pett

(2002) argue that there is no clarity in developing the performance constructs and the existence of trade-offs between efficiency and effectiveness as performance dimensions, other researchers, for example Mentzer and Konrad (1991) and Fugate et al (2010) point out that effectiveness and efficiency should not be two contradictory outcomes. On the contrary, improving operational efficiency can lead to better overall effectiveness and customer satisfaction.

Improving the match between resources and needs requires positive management in the procurement (i.e. cost) aspects when responding to disasters (Fawcett 2013). The disaster management structure needs to manage the disaster rather than operate reactively (Epstein and Buhovac 2014). Planning provides guidance specific to a possible disaster situation, reduces uncertainties in mounting a response, permits the identification (and prepositioning) of possible resource requirements, and provides data from which to formulate the response-funding requirements. During a disaster response, detailed plans may be less important than an organizational capacity to adapt to changing conditions and a flexibility in the implementation of policies, plans, and procedures (Shah et al. 2017). At the same time, the organizational ability to modify and update response plans and revise the resource needs and procurements plans is critical to a flexible and adaptive operation (Maghsoudi and Pazirandeh 2016).

1.2.3 Humanitarian supply chain

In the literature review chapter, it was found that humanitarian supply is involved in 80% of all response activities (Wassenhove 2010), which involves relief goods and equipment procurement and distribution. During the disaster response phase, a well-structured humanitarian supply chain can not only mobilize response resources, but can also enhance the speed of the disaster response along with the information flow between the government and the NGOs. Therefore, it is important to have a well-structured humanitarian supply chain to achieve operational effectiveness and cost efficiency.

Another interesting component of the conceptual framework is the relationship between NGOs and the government, with both agencies performing coordinated activities such as search and rescue, first aid, public preparedness, and public education in disaster management. In between are the human supply chain and the emergency planning components, whose successes greatly rely upon enhanced efficiency and effectiveness during a disaster response.

The conceptual framework above illustrates the knowledge gap that will be closed in this thesis which examines the linkage between the humanitarian supply chain and the emergency plan in order to enhance the effectiveness and efficiency of a disaster response.

1.3 Research aim and objectives

The aim of this research is to investigate the methods to enhance the effectiveness and efficiency of the response by the government and NGOs to a disaster, by using the case studies of the Wenchuan Earthquake and Typhoon Morakot. This research has several objectives: firstly, provide definitions and critically examine the DM framework, emergency planning, and emergency plan; secondly, explore the key factors and challenges in humanitarian supply chain management; thirdly, compare the government emergency planning, the government's and NGOs' humanitarian supply chain management between the cases of the Wenchuan earthquake (China) and typhoon Morakot (Taiwan); and finally, to provide recommendations to enhance the effectiveness and the efficiency of a disaster response.

1.4 Structure of the thesis

Following this introductory chapter, Chapter 2 provides a detailed review of the existing theoretical concepts of DM and the disaster cycle which include the mitigation, preparedness, response and recovery phases.

Chapter 3 provides a more thorough outline of the current knowledge of emergency planning and summarises the principles of emergency planning. Furthermore, this chapter also highlights and analyses the strengths and weaknesses of the all-hazard approach.

Chapter 4 critically examines the relationship between the business supply chain and the humanitarian supply chain; discusses the relevant issues and the challenges facing the humanitarian supply chain and explores its importance.

Chapter 5 presents a broad literature review on the relevant theories and challenges facing NGOs; and critically analyses the responses by NGOs' in the DM cycle.

Chapter 6 establishes the research methodology. It begins with an introduction to the conceptual frameworks of research and then proceeds to explain the research philosophy. It evaluates the strengths and limitations of the different research approaches in order to justify the choice of the research strategies (semi-structured interviews and case studies) used in this study. It also defines the data collection methods used (primary and secondary), their sources, strengths and drawbacks, and validity and reliability.

Chapter 7 and Chapter 8 describe the China and Taiwan case studies. The chapters critically examine and evaluate the responses by the governments and NGOs to the disasters and provides a discussion of the key challenges and recommendations.

Chapter 9 provides a comparative analysis of the two disasters; and then the discussion and recommendations from this research are given in Chapter 10.

Chapter 11 is the conclusion in which the research results are discussed with the identification of the main outcomes in relation to the research objectives. Finally, it concludes with a discussion of the limitations of the research and suggestions for further research are also included.

Chapter 2 Disaster Management

2.1 Introduction

Broadly speaking, it can be said that a disaster is any occurrence that can cause tremendous damage, loss of human life, ecological disruption, or deterioration of health and health services on a scale that is sufficient to warrant an extra-ordinary response from within and outside the affected community. According to Coppola (2015), a catastrophe causing illness or injury qualifies as a disaster when the number of people affected surpasses 30, and thus require a hospital emergency response. There are two important phases in the disaster management cycle, the risk reduction phase and the recovery phase. Disaster response, rehabilitation and reconstruction are recovery measures that follow the occurrence of a disaster, while mitigation and preparedness are risk reduction measures that are undertaken before any such phenomena can occur. Disasters can occur naturally or through means which are human engineered. Natural disasters are the most common and cannot be prevented, and people can only take precautions in the face of their imminent occurrence. These can include tsunamis, floods, volcanos, earthquakes, droughts, and hurricanes. This chapter reviews the historical and existing theoretical concepts associated with disaster management and the disaster cycle.

It is noted that, academics have clear definitions for emergencies and disasters, but this is not the case for practitioners who tend to see anything as an emergency, because emergency situations can be planned for, whereas disasters cannot (Alexander 2016). This leads to the problem that if disasters and emergency situations are categorized as one using the same standards, when a disaster or emergency occurs, this can lead to emergency plans that are rigid and which lack flexibility when providing disaster and emergency response and relief.

2.2 Disaster Management

2.2.1 Differentiating between the disaster and emergency

The definitions of the emergency and disaster have long been debated in academia (Alexander 2003). The emergency has been defined as an out of the ordinary situation that must be managed by urgent procedures in order to stop it escalating, thus having consequences that are more serious and damaging. Thus it can be said that an emergency requires a timely response with a high degree of organization (Alexander 2016). An alternative definition has also been put forward by Lindell et al. (2006) who have argued that the emergency can be defined as a minor event that causes a few casualties and a limited amount of property damage. Yet another definition argues that the emergency is a serious, unexpected, and often dangerous situation requiring immediate action (Moore et al. 2007). In the UK, the Civil Contingency Act 2004 defines an emergency as: “(a) an event or situation which threatens serious damage to human welfare in a place in the United Kingdom; (b) an event or situation which threatens serious damage to the environment of a place in the United Kingdom, or (c) war, or terrorism, which threatens serious damage to the security of the United Kingdom”. This specifically identifies that in the case of an emergency it is possible to manage through a certain pre-planned procedure.

In contrast, the disaster can be defined as an event that has a substantial negative impact on human lives and activities and on the built or natural environment. Commonly it will be marked by mortality and morbidity, destruction and damage, interruption of normal activities and economic losses (Alexander 2016; Perry and Lindell 2007; Lakha 2004; Coppola 2011; Coppola 2015; Fagel 2013; Dillon et al. 2009). UNISDR share a similar view, and determine that a disaster is a serious disruption of the functioning of a community or society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources (UNISDR 2007).

Some scholars tend to define an emergency, crisis, or disaster according to the complexity and uncertainty of the situation. When an event requires a standard procedure in response, this is called an emergency. However, when the event becomes more complex and requires a rapid response, this emergency becomes a crisis event. If decision makers do not respond to the crisis effectively, then the event will turn into a disaster, where “a disaster is distinct from both emergencies and crises only in that physically it represents the product of the former. Disasters then, are the irreversible and typically overwhelming result of ill handling of emergencies and crises” (Borodzicz 2005).

Nevertheless, many scholars and official government departments refer to emergency management and disaster managements in the same way, and use the phrases emergency and disaster management interchangeably (Laine 2016). Coppola (20015) believes that this depends on the perspective from which disasters and emergencies are considered. For example, from the perspective of emergency management professionals, emergency operations focus on all types of disasters and emergencies. Disaster management personnel believe that emergency management is just a part of disaster management, and from the perspective of crisis management, both emergency and disaster situations are included in crisis management.

Having examining the differences between a disaster and an emergency, in consideration that there were less than 90 natural disasters that took place in the last century (Bullock et al., 2006); and given that this thesis is focused on the management and organisation of disaster responses, the first group of definitions seems better suited for this thesis.

2.2.2 Historical Development

The idea of disaster management was first coined in the United States, but was originally referred to as emergency management (Bullock 2006; McElreath et al. 2013). The United States suffered several major disasters in the 1960s, including the Alaska Earthquake in 1964, Hurricane Betsy in 1965, and Hurricane Camille in 1969. These natural disasters in the 1960s and 1970s ultimately lead to the creation of the Federal Emergency Management Agency (FEMA) in 1979. This subsequently drew the attention of some public administration researchers, and became the focus of organizational and administrative study (Public Administration Review 1985). However, the policy problems associated with major natural disasters became the focus of those interested in policy design, policy implementation, and policy and program evaluation (Sabatier and Weible 2014).

The watershed for public administration research in emergency management was a 1984 workshop sponsored by FEMA and the National Association of Schools of Public Affairs and Administration. This expanded the community of public administration researchers and led to the publication of a 1985 special issue of Public Administration Review, the preeminent journal in the discipline on emergency management (Waugh 2005). FEMA and the National Association of Schools of Public Affairs and Administration (NASPAA) recognized the need for greater focus on scholarship and professional practice in emergency management (Comfort Waugh and Cigler 2012). The two organizations entered into an agreement to cultivate the interest in emergency management among public administration scholars. Their goals were to develop a strong disaster research community and to foster a heightened standard of professional practice among public administrators in managing emergencies.

The disaster events that occurred in 2004, which were principally the Indian Ocean or “Christmas” earthquake and tsunami, and the four hurricanes that struck central Florida,

gave the field of emergency management even greater visibility and raised more questions about preparedness and response, especially alert and warning systems and evacuation, and social and economic recovery (McEntire 2007; Zakour 2012). Since that time, administrative imperatives, often driven by disaster events, have provided impetus for scholarship and have encouraged the development of academic programs in emergency management and related professional fields. These also addressed the policy implications of decisions made in the months following the attack on American democracy and subsequent decisions, such as the creation of the Department of Homeland Security (McEntire 2007).

2.3 Disaster Management cycle

The number of natural disasters taking place each year is noticeably increasing and these frequently bring a loss of lives and damage to economies (Less 2012). However, a report from UNISDR (2016) has stated that while the number of disasters has increased and the subsequent monetary loss is also increasing, the loss of life has actually reduced. This is supported by disaster impact statistics which show that while more disasters occur with larger populations being affected, fewer people are dying, even though economic losses are increasing (IFRC 2000).

Due to the increasing number of disasters that are occurring, it is clearly necessary to identify and implement measures in order to reduce their occurrence or impact. Ergun et al. (2005) have stated that the occurrence of such events cannot be controlled, but their impact can be reduced by using different means including disaster management. In this context, UNISDR (2015) use the phrase disaster risk reduction to refer to using mitigation and intervention strategies to reduce the impact of disasters.

To mitigate and intervene to reduce the impact of disasters, the disaster management cycle has been proposed. There are several models that describe the disaster management cycle, these consisting of either four phases (Coppola 2015; Alexandra 2002; Ergun et al. 2005; Cozzolino 2012; Van, 2006) or five phases (Lin and Pathranarakul 2006; UNSIDR 2015a). However, the four-phase cycle is generally the preferred model, for example by the Public Administration Review (1995), Alexander (2002) and Coppola (2010), as it recognised that the four phases capture most of the essences of disaster management (Public Administration, 1995). Disaster management can be divided into mitigation, preparedness, response and recovery (Coppola 2015; Alexandra 2002; Ergun et al. 2005; Cozzolino 2012; Van 2006), with the most recognised four phase cycle shown in Figure 2.1 below, created by Alexander (Alexander 2002; Coppola 2015). Alexander (2002) further specified the functions and operations of each cycle (see Section 2.2.1-4). In addition, Alexander's model is more comprehensive than that proposed by UNISDR which was a model for the Hyogo Framework for Action (2005-2015), as a series standards to guide operations. The following sections explain the key tasks, requirements and challenges of the four phases of the disaster management cycle.

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Figure 2.1: The disaster management cycle (Alexander 2002)

2.3.1 Mitigation

The focus during the disaster mitigation phase is prevention before a disaster occurs (Schwab, Sandler and Brower 2016). Mitigation is defined as any sustained effort to reduce the disaster risk by reducing the likelihood and / or the consequences of the risk of the hazard (Coppola 2015). In other words, mitigation seeks to reduce the likelihood of disasters and the negative impact following disasters (Coppola 2015). The function of mitigation is to tackle the cause of disasters and thus reduce the possibility of disasters, and also limit the impact of disasters on people, companies, and government agencies, where the key is to prevent a disaster occurring in the first place (Lindell, Prater and Perry 2007). Venton (2009) describes that mitigation might entail both structural and non-structural measures implemented in order to limit the adverse effects of natural hazards, technological hazards, and environmental degradation.

Table 2.1: Risk matrix (Vatanpour et al. 2015)

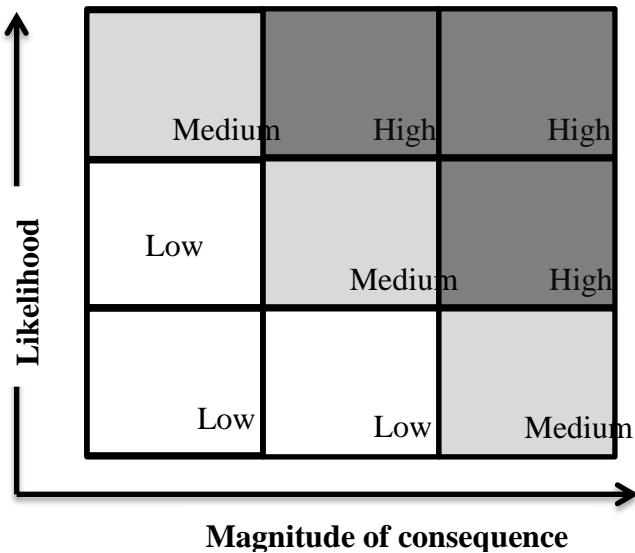


Table 2.2: Classification of risks (Coppola 2015)

Level of risk	Indication	Action	Requirement
High risk	Indicate high likelihood with high impact	Immediate action	Requires highest priority for mitigation and emergency planning
Medium risk	Indicate sufficient high likelihood and impact	Prompt action	Provides consideration for further mitigation and planning
Low risk	Indicate low likelihood and impact	Advisory in nature	Requires additional mitigation emergency planning

In the case of the natural disaster, the key task for mitigation is carrying out a risk assessment (Coppola 2013) which also incorporates application of the possibility and magnitude impact matrix UNISDR (2005) have argued that the disaster mitigation and preparedness phases are the most important phases in the disaster management cycle. In particular, in the Hyogo Framework for Action (1995) and Sendai Declaration (2015), these highlight the usefulness of using risk assessment and mitigation to reduce disaster risks. It is believed that these can predict the probability of a disaster to a high degree. Table 2.1 illustrates the relationship between the possibility and magnitude of consequences of a disaster where low likelihood and low magnitude have less impact and vice versa. Table 2.2 further explains the differences between the different levels of risk.

The identification of the risks is the first step of mitigation which is then followed by intervention strategies as the second step. This stage involves many stakeholders such as government institutes, NGOs, and researchers (Coppola 2015). Nevertheless, the NGOs that participate in community development projects are the only type of NGOs involved in this phase that can help communities prepare for a disaster (Alexander, 2002). For

example, the Taiwanese government carried out a risk assessment before Typhoon Morakot occurred. It was found that there were several emergency supplies repositories and a few groups of aboriginal people from Chiayi County that were at huge risk, and thus the authorities transferred supplies and people to a safe zone immediately (Maa 2001).

2.3.2 Preparedness

Disaster preparedness is the advanced actions taken in preparation for a disaster to ensure that there is an adequate response to its impacts, and so that the relief and recovery from its consequences can be achieved while eliminating the need for any last-minute actions (Coppola 2011). The main activities undertaken in this phase include training exercises, providing early warnings and information describing what people should do in order to transfer risks in the face of imminent property loss. These actions and activities will be different depending on the information given and previous similar attempts to implement them (Perry, Lindell and Tiemey 2001). In terms of approaches to preparedness, the government component, which includes administration, emergency management, public health and NGOs can be considered to be one group, while individuals and businesses are the second group (Perry, Lindell and Tiemey 2001). Preparedness by the first group is normally defined and conducted through the creation and application of an emergency operation procedure and bolstered by training and exercises (Perry et al. 2001).

Preparedness involves activities and measures put in place in advance to ensure efficient responses to the impact from disasters (McElreath et al. 2013). It might entail leadership training and reinforcing community participation. As noted by Venton (2009), strategies for the issuance of well-timed and useful early warnings are also measures that ought to be put in place in advance, including the measures for the transitory evacuation of persons and property from endangered locations, for instance communities living in

close proximity to a likely cause of flooding. Therefore, disaster preparedness is based on knowing what to do in the aftermath, and being equipped with the right tools to do this effectively. This difficult process may take years before attaining satisfactory levels, and maintaining such levels is an on-going process.

The mainstreaming of disaster mitigation and preparedness is continually acknowledged as an important step in disaster management discourse. This explains to some extent why mitigation and preparedness is becoming increasingly prominent in the disaster management cycle (Coppola 2011; UN 2015a). Houghton (2005) has argued that disaster preparedness and mitigation can be regarded as a principal issue to emerge from contemporary humanitarian assistance appraisals. He suggests that NGOs can effectively employ disaster preparedness by educating local communities in relation to the risks they encounter, and in addition by assisting them in the development of their coping mechanisms and emergency plans in the event of an inevitable disaster. In other words, modest prevention is more significant than addressing the disaster. In this context, educated communities that are prepared with strategies for a satisfactory response in an emergency condition, will evidently assist in easing the works of a relief operation, where in turn it will accelerate the process towards restoration.

2.3.3 Response Phase

When an emergency occurs, there is a need for time-sensitive actions to ensure the safety of both lives and property. Such needs are what constitute the response phase. They include notification of the relevant authority of the crisis, where usually, the relevant authority consists of the emergency management personnel. Then there is always the need to warn the population and conduct the evacuation and sheltering of the population. The response phase also involves updating the population with any relevant information that would assist with the evacuation process. And incorporates rescuing individuals and treating the victims, maintaining the rule of law, accessing the damage,

addressing any mitigation issues that arise from the response activities, and requesting help from external sources if needed. In the event of rapid onset disasters, for instance earthquakes, the response phase might last for several weeks to a few months (Wassenhove 2006). In the event of slow onset disasters, for instance droughts, the response phase might last for several months or run into a number of years.

The response phase commences instantly following the occurrence of a disaster and involves an instantaneous response or relief, as well as a medium-term reaction (Haddow, Bullock and Coppola 2017). The function of a disaster response includes actions aimed at reducing injuries, loss of life, and damage to property and the environment, that are undertaken during and immediately after a disaster event (Dillon 2014). The response processes begins as soon as it becomes apparent that a disaster event is imminent and lasts until the emergency is declared to be over (Bullock, Haddow and Coppola 2011). In addition, the response includes not only those activities that directly address the immediate needs, such as first aid, search and rescue, and shelter, but also includes identification, analysis, assessment, and monitory systems developed to coordinate and support such efforts (Coppola 2015).

It is important to note that the ratified systems for disaster management endeavour to reinstate the infrastructural and systemic functionality of the affected area (Coppola 2011). It is essential to note that the medium-term response builds on the initial steps in the direction of recovery such as evaluating the damage caused to communities, institutions, infrastructure, industry, as well as business, and establishes the requisite measures towards restoring these factors to their previous conditions prior to the event or to even better levels (Coppola 2011).

Response and recovery checklist - Disaster recovery begins with stabilization of the incident and ends when the victims have fully recovered from the impact of the disaster. Stabilization refers to the moment at which the immediate threats to human safety and

property emanating from the disaster have been resolved. The beginning of an emergency response is also marked by the beginning of the thoughts on how to rebuild the damage suffered to structures, restore infrastructure services, and return the community to its initial patterns of activity and normal performance levels. The phases of disaster recovery thus include the emergency period, the restoration period, the reconstruction replacement, and the final stage, namely the development phase. The restoration stage starts when repairs to the damage are started, there is the removal of debris, and the return of the evacuees among other rescue activities. The third phase involves activities conducted with the main aim of returning the economy to its initial status before the disaster struck. The final stage is commemorated by the building of memorial structures and attempts are made to improve the community and measures put in place to cater for future disaster occurrence. Some scholars have argued whether relief should be classified into the response or recovery phase, depending on when the relief work is carried out (Dillon 2014). Stephenson (2005) stresses that immediately a disaster has occurred the primary concern involves effective relief. This entails assisting the persons affected in recovering from the immediate impact of the disaster. This relief work involves offering food, shelter, clothing, and medical care to the impacted persons (The Sphere Project 2011).

Response is by far the most stressful phase of the disaster management cycle, as it conducted during periods of very high stress, in a highly time-constrained environment, and with limited information (Coppola and Maloney 2009). In addition, the response phase requires holistic cooperation among government agencies, NGOs, and to some extent the military (Manandhar et al. 2017; Chen and Li 2016; Paton and Johnston 2017). For example, the government first response group will be police officers, the fire department, emergency medical personnel, while the first response group of NGOs will be risk assessment and monitory professionals.

2.3.4 Recovery Phase

Disaster response is followed by disaster recovery, a process mainly aimed at bringing systems effected (by the disaster) to their normal state, as much as possible. Disaster recovery efforts extend after the occurrence of a disaster. And recovery operations aim at the restoration of all the disaster impacts so that society and the economy can be brought back to normalcy. Additionally, recovery aims at giving the affected area and individuals certain degrees of financial, physical, environmental, and social stability. In essence, recovery is all about indemnifying the society or the persons affected. Post disaster recovery plans and operation can be divided into two periods based on the intended recovery goals - short-term and long-term recovery plans. Short-term recovery plans are always the first of the set and can often last periods exceeding 6 months but do not surpass the 12 month mark. These involve the delivery of much needed immediate services that would bring the community and the affected people back on their feet while the long term plans are initiated. The long-term plans themselves are often implemented over a long period of time as they are intended to bring permanent and long term solutions to the affected community and individuals. The plans are thoughtfully strategized and executed over time. Recovery generally helps the community attain economic diversification so that it can start all over again, and involves infrastructural development and renovations as well as business financing operations.

The recovery phase is sometimes difficult to differentiate from the response phase. Some relief efforts may last for longer than the recovery phase, e.g. healthcare support such as psychological treatment. Rehabilitation refers to a set of decisions and actions taken following a disaster for the purpose of restoring/improving the pre-disaster state in the disaster hit area. It is important that these decisions be tailored to decrease latent vulnerabilities and facilitate actions to reduce disaster risk. Reconstruction concerns repairing the damaged living conditions of the affected communities in consideration of their long-term economic, environmental, and social sustainability (Boano 2014). As

shown in Figure 3, disaster recovery management can be considered to incorporate both relief and rehabilitation.

Researchers have divided disaster recovery into a number of stages, but these definitions vary. Kates and Pijawka (1977) proposed a frequently cited four phase model which begins with the emergency period, which lasts for a period ranging from a few days to a few weeks and encompasses the emergency response period when the emergency operation plan is implemented. Next comes the restoration period, when repairs to utilities are made, debris is removed, evacuees return, and residential, commercial, and industrial structures are repaired. This period can take weeks to months to complete. The third phase, the reconstruction replacement period, involves rebuilding capital stocks and returning the economy to its pre-disaster levels. This period can take from months to years. Finally, there is the development phase, when commemorative structures are built, memorial dates are institutionalized, and attempts are made to improve the community. Sullivan (2003) used a similar typology which consists of four “intra-recovery elements”, these being post-impact, restoration, replacement / reconstruction, and commemorative, betterment and developmental reconstruction.

Others have divided the recovery period into somewhat different phases. The United Nations Disaster Relief Organization (UNDRO 1984) calls the period from the day the disaster first impacts to Day 5 the immediate relief period, followed by the rehabilitation period (Day 5 to Month 3) and the reconstruction (Month 3 onward) period. Schwab and colleagues (1998) adopted a similar three phase typology that broadly distinguishes between the emergency response, short term recovery, and long term recovery. Alexander (1993) (Figure 2.2) described three stages of disaster recovery, with the first being the rehabilitation stage which involves the continuing care of the victims. During the temporary reconstruction stage, temporary bracing is installed for any unstable buildings and bridges, and prefabricated or other temporary housing is established. Finally, the permanent reconstruction stage relies on good administration and management to achieve full recovery of the community.

As was the case with conceptualizing emergency management as a sequence of phases, namely hazard mitigation, emergency preparedness, emergency response, and disaster recovery, defining disaster recovery as a sequence of phases is also problematic. Even the earliest formulations noted that these phases often overlap in practice, shortening the whole recovery period (Kates 1977). It is now generally accepted that disaster recovery encompasses multiple activities, some implemented sequentially and others implemented simultaneously. At any one time, some households might be engaged in one set of recovery activities while others are engaged in other recovery activities. Indeed, some households might be fully recovered months or years after others, while there might be households or businesses that never recover at all. Thus, attempts to define finely differentiated phases of disaster recovery are inherently limited in their validity. Because of the simple and self-explanatory nature of their typology, Schwab and colleagues' (1998) very broad distinctions of the phases of emergency response, short term recovery, and long term recovery will be used here to organize the discussion in the remainder of this chapter. The sections that follow begin with a description of what happens to two basic social units—households and businesses following a disaster.

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Figure 2.2: Phase of recovery in the aftermath of disaster (Alexander 2002)

According to the Hurricane Disaster and Emergency Committee (2010), the recovery phase entails actions in regards to areas such as rehabilitation and reconstruction. This phase also presents opportunities towards developing risk reduction measures that may be put in place in the subsequent pre-disaster phase (Smith 2012).

While there has been significant focus on the pre-disaster preparedness and mitigation aspects, post-disaster reconstruction issues should not be overlooked (Schilderman and Lyons 2011). Rehabilitation and reconstruction programs are development opportunities, and therefore their sustainability is an important issue (Nakagawa and Shaw 2004). Each disaster has different characteristics and disasters like earthquakes can be particularly destructive especially to lives and property. According to Nakagawa and Shaw (2004), when damage is caused to an urban area, the massive re-planning of the city is required. All the stakeholders involved should therefore put tremendous efforts into reducing vulnerability and enhancing sustainability in the reconstruction and rehabilitation programs (Shaw, Gupta and Sharma 2003). However, the key question is: even though much effort is put into disaster recovery programs, why have some communities carried out faster (in terms of time frame) and more successful (in terms of holistic and participatory) recovery programs than others? Where do such differences come from? It is prudent to realize that involvement in recovery depends on the willingness of the interested parties and the goodwill of the federal or the state government involved.

Recovery operations are always divided into two types: short-term and long-term. The differences between the long-term and short-term recovery activities are numerous. The main distinction is that short-term recovery activities are those immediate (i.e. within two weeks) activities performed to maintain critical human systems at the minimum required standards for their optimum duration (Schilderman and 2011). The challenges during the recovery stage are about short-term and long-term relief and sustainability. Different NGOs play different roles and this collectively helps to hasten the recovery processes and therefore the whole operation. This follows from the theory of the

division of duty (see Chapter 4). The National Response Framework of the United States published by the Department of Homeland Security in 2008 describes short-term and long-term recovery as follows:

Short-term recovery is immediate and overlaps with the response. It includes actions such as providing essential public health and safety services, restoring interrupted utilities and other essential services, re-establishing transportation routes, and providing food and shelter for those displaced by the incident (Smith 2012). Although called “short term,” some of these activities may last for weeks. Long-term recovery, which is outside the scope of the Framework, may involve some of the same actions but may continue for a number of months or years, depending on the severity and extent of the damage sustained. For example, long-term recovery may include the complete redevelopment of damaged areas (Department of Homeland Security 2008:45).

However, normally NGOs play a major part in reconstruction and development, however usually less than 10% of NGOs (compared with the total from the time the disaster occurs) will remain in an affected area for more than 6 to 12 months (Lewis and Kanji 2009).

2.4 Conclusion

This chapter has considered the four stages of disaster management, namely mitigation, preparedness, response, and recovery. The findings here indicate that the response phase is more difficult to implement due to the improper coordination between stakeholders and all the agencies that are mandated by law to take proper action. An example is a relief operation that should be conducted by government bodies and NGOs. When the two independent parties fail to communicate with one another, coordination may fail and the operation might not proceed as planned as conflicts may arise. In the event that

a response operation might need the intervention of two or more independent bodies, then proper communication is necessary to ensure cohesion and common goal. This is the most effective approach to managing this problem and any other that might arise during any of the other phases. This is equally dependent on good and proper emergency planning where all the interested response parties are effectively notified on the best practices while at the scene.

The next chapter will extensive discuss the need for holistic emergency planning which incorporates all the tasks supposedly carried out by all the relevant stakeholders, including government institutions and NGOs.

Chapter 3 Emergency Planning

3.1 Introduction

The chapter commences with an in-depth examination of emergency planning, the different kinds of emergency planning and the differences between them. It then proceeds to identify the principles of emergency planning in the second section. The third section considers an example of emergency planning, and what should and should not be done as part of this planning. The last section of this chapter examines whether an all hazard approach to an emergency would be effective in the management of disasters. Studies have indicated that the response phase of disaster management is always very effective when sound planning is adopted, and thus this chapter highlights all the relevant standards for this response phase.

3.2 Emergency planning

According to Alexander (2002), emergency planning is the implementation of disaster management cycles during the legislation stage, where planning is the process, actions, and guidance for operational/practitioners to follow. This makes it possible to plan actions during the disaster management cycle.

The main scope of emergency planning is to reduce the risk to life and limb posed by actual and potential disaster (Alexander 2002). Although it is also extended to include damage reduction, ensuring public safety during the aftermath of a disaster, and indirectly caring for survivors and the affected area (Fagel 2013). Fagel (2013) notes that in order to deal with the increasing number of natural and man-made disasters, efficient and effective emergency planning can help to reduce the impact of these types of disaster.

Emergency planning is a continuous and progressive process that allows growth and supports adaptation to changing circumstances (Alexander 2002). Perry and Lindell (2007) further describe that emergency planning is achievable through extensive and effective consultations, exercises, equipping, and critiquing activities. Emergency planning activities are based upon the premise that an emergency will occur and that plans, procedures, and resources must be prepared in advance. These are designed not only to support a timely and effective emergency response to the threat of imminent impact, but also to guide the process of emergency recovery (Coppola 2013). As such, the agency managing an emergency needs to address a number of pertinent issues including: which agencies will participate; what emergency response and recovery actions are feasible for each emergency; how the agencies will function; what resources the agencies need; and how the emergency planning (preparedness) will be established and maintained. Lakha (2004) explains that effective emergency planning should encompass plans for pre-, during and post-disaster events, and needless to say, effective and sound planning is a major component of emergency planning.

- Before the event: includes decisional planning, testing and control of major accidents as well as hazard planning
- During the event: includes an activate disaster and emergency policy and pre-planning, co-ordination and code of conduct
- After the event: includes immediate, short-, medium-, and long-term activities.

The emergency planning activities after the event include those activities that are conducted during the emergency and immediately after, so that the situation following its impact can be stabilised. The primary goal of the emergency planning is to save lives and property (Doyle 1996; Ford and Schmidt 2000; Kelly 1995; Ramachandran 1999; Tierney et al. 2001) by providing emergency resources, such as emergency and rescue equipment and supplies, food, water, shelter, and medical provisions, and systems at the right time and the right place. During this phase, the responsible personnel managing the emergency must also continually assess the damage and coordinate the arrival of converging equipment and supplies so they can be deployed promptly to those areas at

greatest need (McEntire 2014). The response phase ends when the situation has been stabilized, which means that the risk of loss of life and property has de-escalated back to the pre-crisis level. The response phase is actually the phase that puts the plans in the planning phase into action.

According to Alexander (2016), the success of the adopted emergency plan in disaster management cycle depends on three critical emergency response factors, these being the response plan, the time and the location of the disaster. The pre-recovery and response plans that are put in place before the occurrence of an emergency also matter in determining the success of the whole emergency plan. And while each phase of emergency management is unique, they often overlap with each other during their execution (Perry and Lindell 2006).

3.3 Principals of Emergency Planning

It is believed that effective emergency planning can reduce the impact of a hazard on human lives and properties. Without effective planning, it is possible there will be a failure to anticipate and tackle potentially foreseeable contingencies (Alexander 2005; Perry and Lindell 2003; Fagel 2014). Emergency planning should be seen as a continuous process (Perry and Lindell 2003), and informal emergency planning should clearly define responsibilities and procedures to prevent vagueness and miss-communication (Alexander 2005; Perry and Lindell 2003; Fagel 2014). The agencies involved in dealing with any potential hazards should be involved in the policy making process. In addition, the interoperability of the agencies involved in an emergency should be taken into consideration (Manyena 2013).

The most effective and common standard principles for evaluating whether or not emergency planning has worked have been identified by Alexander (2016). There are

46 of principles (see Appendix 1) that should be considered from creating to using an emergency plan. This means that these different principles proposed by Alexander are used for different planning functions and activities. It is noted that numerous other principles have also been proposed in similar initiatives (for example Quarantelli 1982; Lindell and Perry 1980 and 1992; Parker 1991; Rockett 1994; Perry and Lindell 2003; and Alexander 2005).

Figure 5 illustrates the eighteen criteria/standards for emergency practitioners which they should consider when planning the creation of an emergency plan, these being truncated from: Alexander (2016); Quarantelli (1982); Lindell and Perry (1992); Parker (1991); Rockett (1994); and Perry and Lindell (2003). These criteria are the summation of experience, theory and good sense applied to the process of writing, revising, testing and utilising emergency plans. Alexander (2005) has stated that his inspiration was the lists of criteria and guidelines given in previous studies. Based on these articles, these suggest there are 18 standards for emergency planning. Table 3.1 provides a detailed summary of the standards for emergency planning.

Table 3.1: Emergency plan Standards (Alexander 2016)

1	The basic or reference level of emergency planning is that set by the municipal government.
2	The plan should be prepared by, or under the direction of, a qualified emergency planner.
3	There should be only one plan, not several, and this should be cover all likely hazards.
4	The plan should be written in clear, simple, unambiguous language.
5	The plan should conform to the laws on emergency and disaster management that are in force in the country or region it pertains to.
6	The plan must be specific about the extent, limits, and limitations of its jurisdiction.
7	The plan should seek to be fully compatible with the plans and planning requirements at other levels of government and in neighbouring jurisdictions.
8	The first objective of the plan is to ensure that lives are not lost unnecessarily.
9	The second objective of the plan is to match urgent needs with appropriate resources in the most efficient and timely manner.
10	The plan should be based on a careful, and as far as possible exhaustive assessment of

	what is likely to happen when an emergency occurs in its geographical area of jurisdiction. It must be based on adequate basic research.
11	The emergency plan should take account of any urban and regional planning provisions in effect in the area under its jurisdiction, especially regarding the hazardousness of the location and the siting of critical facilities.
12	The plan should conduct and present the results of a full audit of the resources that will be used during emergency operations.
13	Emergency planning should deal with processes, not merely quantities.
14	The plan should adequately specify the roles and activities of each and every participant in the risk management and emergency operations activities it covers.
15	Irrespective of whether or not an emergency plan is focused on the early post-impact phase, it should take account in an integrated manner of all the phases of the 'disaster cycle'.
16	Activities described in the plan that are designed to combat disaster should include or at least facilitate sustainable measures for disaster prevention.
17	The plan should seek to integrate and embrace provisions for the private sector, hospitals, industries, airports, etc.
18	The plan should constantly be revised and circulated among its participants, and should be tested regularly.

3.4 Emergency Operation Plan

According to Dillon (2014), the emergency operation plan is a set of proposed actions designed to manage a dangerous unforeseen sudden situation and to prepare for different types of disasters. The emergency plan describes the activities, gives instructions, directs policy, and crucially, is only effective when implemented by people trained in its use. Therefore, the regulations not only set the standards for the emergencies but also practice/operations for a disaster situation. However, Alexander (2016) has claimed that an emergency plan is a co-ordinated set of protocols for managing an adverse event, whether expected or untoward, in the future. It seeks the most efficient way to use essential resources to satisfy urgent or chronic needs under conditions of extreme duress.

Therefore, the emergency plan is of importance as it is able to guide the disaster management (Haddow, Bullock and Coppola 2012). In fact, all disaster reliefs (both internal and domestic) have to be carried out using a national or local emergency plan as a guide, which gives adequate instructions to the relevant authorities during a disaster response. For example, during the Wenchuan Earthquake in China, many international NGOs delivered aid and sent personnel to the disaster spot, but had to follow the instructions of the Chinese National and Local Emergency Plan and operate under the supervision of the local Chinese authorities.

Although there is uniqueness in every disaster, there is enough common ground between events to make forecasting, prediction, warning and the anticipation of consequences possible, and therefore it is possible to plan feasible tasks (Alexander 2005). An emergency operation plan can therefore be defined as: a written instrument that provides a set of guidelines concerning the use of available resources to solve pressing problems caused by the impact of an adverse event (Alexander 2016). The emergency operation plan describes how a facility will respond, act, and recover from an occurrence of a disaster. It has six elements which are communications, resources and assets, safety and security, staff responsibilities, utilities and supportive activities, and operates on an “all hazards” basis. The all hazard approach gives the plan the ability to respond to a range of emergencies varying in degrees, time frame, and cause. It also gives the structure and processes an organization uses to recover from calamities and return to its initial state before the disaster struck. This organization proposes very specific terms that the facility needs to follow to the letter.

Notably, the purpose of an emergency plan is more to co-ordinate activities than provide the basic procedures (Alexander 2016). Moreover, emergency plans are part of the process of creating resilience and must therefore promote both robustness and the adaptability of society in the face of hazards (Alexander 2016). Thus, in order to make sure of the effectiveness of a disaster response, it is important to have a holistic emergency plan.

Choosing the right plan title is also important. This discussion may seem complex and semantic, but it is necessary to make these distinctions to increase the clarity of the planned approach. Thus, they are important descriptors of the planning hierarchy.

3.5 All Hazards approach to emergency planning

There are single hazard and all hazard approach in emergency planning (Alexander 2014). There are many different types of hazard, the risk assessment of single-hazard approach focused on the specific type of hazard or threats. In contrast, the all-hazards approach it aims to include all types of hazards, irrespective of its origination, and generate a balanced overview (Parker and Handmer 2013). The all-hazards approach is currently seen by most organizations and experts throughout the world as being the most effective method for dealing with the various risks and hazards faced by nations and their communities (Adini et al. 2012; Ayyub, McGill and Kaminskiy 2007). In the United States in particular, the National Response Framework has chosen to make this approach mandatory for all government entities, further increasing its influence (McQuire and Silvia 2010). However, what many fail to realize is that while the all-hazards approach to emergency management does have its advantages, it also has its disadvantages and weaknesses. The all hazard approach is the emergency operations plan that advocates for all the threats and risks of doing something to be considered as hazardous. Once the fears are confirmed, the results are always hazardous and this is the reason why every possible plan should consider any planned uncertainty as hazardous. Contrarily, most emergency managers believe that the all-hazards approach to responding to disasters means planning for every possible eventuality (Canton 2007).

There are two components of all-hazards planning, the first is based on the concept of risk analysis (Canton 2007). The first principle of emergency management states that one must "consider and take into account all-hazards" (Kunreuther 2017). The third principle of emergency management, encourages the use of risk analysis to assign

priorities and resources (Alexander 2002). Instead of applying the limited planning resources to all possible hazards, risk analysis instead focuses on the community vulnerability to specific hazards. This allows the resources to be allocated to those risks (not hazards) that are most likely to affect a given area or locality (Kunreuther 2017).

The second component of all-hazards planning is the development of the capacity to deal with multiple hazards through functional planning (Canton 2013). This is based on the assumption that certain core functions, such as warning, evacuation, and sheltering, will be needed in most disasters, and will be to a large extent handled in the same way. This creates a baseline capability that cannot only deal with anticipated risk but can also be modified to deal with the unexpected (Canton 2013).

3.5.1 Advantages

The advantages of the all-hazards approach to emergency management, as discussed thus far, is its potential to increase the speed of a government's response to an emergency (Waugh 2005). This particular advantage can be attributed to the fact that the approach requires coordination between all organizations involved in the four phases of disaster/emergency management: mitigation, preparedness, response, and recovery (Petak 1985). As Hammond (2005) points out, the initial response to a disaster will be chaotic, and the all-hazards approach prevents the confusion and waste of resources that occurs when multiple organizations act independently of one another to achieve common goals, where the more effective the response, the more lives that are likely to be saved.

The same coordination that makes the all-hazards approach to emergency management so economically attractive and efficient also yields a number of further logistical and managerial benefits, particularly when responding to an emergency (Schwab et al.

2016). It fosters an underlying infrastructure of management and resources that can theoretically be used to respond to any emergency or disaster (Epstein et al. 2014). As previously described, it alleviates the need to have multiple and separate plans for responding to each aspect of a potential emergency. In this case, rather than simply consolidating and focusing the plans of several organizations, the all-hazards approach consolidates the several plans that a single entity such as a government might have in place to respond to different threats (Haddow, Bullock and Coppola 2017).

These consolidated action plans are one of the key principles of any incident command system, and allow governments to save valuable time and resources in areas where multiple plans would have previously overlapped (Hammond 2005). Instead of a government needing a specific plan in place for every possible scenario, the all-hazards approach provides a general framework on which all of the government's emergency management operations can be based. Consolidated plans increase efficiency, and once again, allow resources to be saved and used more effectively in the process.

3.5.2 Disadvantages

The disadvantage of all-hazards planning is the fact that those who create an all-hazards plan in a given area typically decide which general emergencies and hazards to prepare for (Bellavita 2008). This being the case, there is a very real danger that the media, political leaders, influential residents, or influential participants in the planning process may become involved in creating the all-hazards action plan and deciding which hazards are most pressing (Waugh 2005). This is dangerous because the media can capitalize on certain disasters, making them seem worse and more common than they really are, and because persons who have experienced personal or family traumas due to a particular kind of hazard or disaster may be biased and become champions of lesser risks (Waugh 2005).

3.6 Summary

This chapter provides a brief discussion of emergency planning and the emergency plan. The disaster response for every single disaster has to be carried out under the guidance of an emergency plan, and in order to achieve an effective and efficient disaster response this requires the best coordination among all organizations and personal. Therefore, it is crucial to have a well-structured and organised emergency operation plan. And while the most efficient emergency plan is the all-hazard approach, there are still ways to improve. For example by including NGOs who are the main players during disaster relief in an emergency plan, and also by enhancing the coordination between different organizations.

Chapter 4: NGOs

This chapter discusses the disaster management cycle employed by non-governmental organisations (NGOs) in their prevention or reduction of potential hazards. The four major phases of the cycle: disaster preparedness, mitigation, response and recovery, are thoroughly discussed. The definition, scope, types and functions of NGOs are also analysed in detail. In addition, the challenges faced by NGOs in their disaster management efforts are articulated.

4.1 Introduction

This literature review endeavours to explore the concept of disaster management as it relates to NGOs and explores how NGOs operate during each disaster phase, as well as presenting the lessons learned in each disaster phase. While a significant amount of international attention is focused on the incidence of disaster events, as well as the interim responses to them, the disaster management cycle entails three major phases: pre-disaster, response and post-disaster. This chapter demonstrates the diversity of activities suitable for each phase.

4.2 Definition of NGOs

NGOs include groups and institutions that are largely or entirely independent of the government and which focus on humanitarian functions rather than commercial gains. They are often referred to as non-profit making entities (Mawlawski 1993; Weiss 1996). This attribute seeks to draw a line between NGOs and other non-state actors, such as multinational companies, whose primary aim is the pursuit of profit. Instead, NGOs are

interested in advancing their designated objectives, such as the interests of their members (Schoener 1997). NGOs activists combine their skills, means and energies in the service of shared ideals (Mawlawski 1993). They also seek to influence governmental actors, such as states or IGOs, or to implement policies in their field of concern. The money they make through publications, fund raising and sales is used to pay for staff and activities to support their aims more effectively.

In addition to the term NGO, a number of alternative terms are used to represent the principle under which these organisations work. These include civil society, private voluntary organisation, trans-national social movement organisation, volunteer sector, non-state actors, self-help organisations and the independent sector. NGOs are task-oriented organisations driven by people who share a common interest. They perform a variety of humanitarian service and functions by pinpointing the concerns and grievances of the people about their respective governments, advocating and monitoring key policies, and encouraging political participation through the provision of information to the public (Coppola 2011). Some NGOs are organised around particular issues such as health, human rights and the environment (Laaser and Epstein 2010). They play a crucial role in monitoring and implementing international agreements, and in the provision of analysis and expertise, as well as serving as early warning mechanisms (Suguna and Surekha 2016).

4.3 Types and roles of NGOs

There are different types of NGOs, which can be categorised by orientation and level of operation (Badiru and Racz 2013; Lewis 2014). NGO types by orientation include charitable, service, participatory and empowering orientation. In the empowering orientation category, the goal is to empower people in terms of social, economic or political change, or increase awareness aimed at improving their lives. Service orientation, on the other hand, includes NGOs that design and implement activities such

as health, family planning and education services for the public (Martens 2002). In contrast, participatory orientation often involves the participation of local people, who contribute cash, land and materials, or provide labour for the implementation of projects. The NGOs in this category are often concerned with community development projects. Charitable orientation, meanwhile, is widely characterised by a top-down paternalistic effort, with the beneficiaries playing quite a passive role. These mostly includes the NGOs that focus on meeting the needs of the poor or those disadvantaged in society by building schools, providing transport, medicine, clothing or food. Table 4.1 below is a summary of the NGOs types by orientation and their main activities. There are many different types of NGOs and these can be understood by their orientation and level of operation, and categorised by their activity types, such as charitable, service, participatory and empowering (Badiru and Racz 2013; Lewis 2014; Lewis 2012; Martens 2002).

Table 4.1: A summary of NGO types by their orientation and main activities (Badiru and Racz 2013; Lewis 2014).

Orientation	Main Activities
Charitable Orientation	Involves a top-down paternalistic effort with little participation by the ‘beneficiaries’. Includes NGOs with activities directed towards meeting the needs of the poor - distribution of food, clothing or medicine; provision of housing, transport, schools etc. Such NGOs may also undertake relief activities during a natural or man-made disaster (Badiru & Racz, 2013).
Service Orientation	Includes provision of health, family planning or education services in which the programme is designed by the NGO and people are expected to participate in its implementation and in receiving the service (Badiru & Racz, 2013; Lewis, 2014; Lewis, 2012).
Participatory Orientation	Characterised by self-help projects in which local people are particularly involved with the implementations by contributing cash, tools, land, materials, labour etc. In the classical community development project, participation begins with the need definition and continues into the planning and implementation stages. Cooperatives often have a participatory orientation (Badiru & Racz, 2013).

Empowering Orientation	Aims to help poor people develop a clearer understanding of the social, political and economic factors affecting their lives, and to strengthen their awareness of their own potential power to control their lives. Sometimes, these groups develop spontaneously around an issue; other times, outside workers from NGOs play a facilitating role in their development. In any case, there is maximum involvement of the people, with NGOs acting as facilitators (Charnovitz, 2006).

NGO types by level of operation include citywide organisations, national NGOs, international NGOs and community-based organisations (CBOs) (Badiru and Racz 2013). City wide organisations mostly exist for the purpose of uplifting the lives of the poor and include organisations such as the Lion's or the Rotary Club, coalitions of businesses, chambers of commerce and industry, and other groups and associations. National NGOs, on the other hand, include organisations such as the Red Cross and other professional organisations. Some national branches also offer assistance to local NGOs; whereas international NGOs include a variety of agencies, including Save the Children, Ford, CARE and religiously motivated organisations. The activities of international NGOs vary as well, from offering assistance to local NGOs to actually implementing the projects. CBOs, meanwhile, arise out of the initiatives of the people. They include religious and educational organisations, sports clubs and women's organisations. They receive support and operate at the local, national and international level (Lewis 2014). Table 4.2 in below is a summary of NG types by level of operation and illustrates that different types of NGOs have different operations and activities; therefore, not all NGOs do the same work.

Table 4.2: NGO types by level of operation (Badiru and Racz 2013; Lewis 2014)

Level of operations	Inclusion	Main activities
Community-based Organisations (CBOs)	Include sports clubs, women's organisations and neighbourhood organisations, and religious or educational organisations. There are a large variety of CBOs; some supported by national or international NGOs, or bilateral or international agencies, and others independent of outside assistance (Badiru & Racz, 2013)	Some are devoted to raising the consciousness of the urban poor or helping them to understand their rights in gaining access to needed services while others are involved in providing such services (Badiru & Racz, 2013)
Citywide Organisations	Include organisations such as the Rotary or lion's Club, chambers of commerce and industry, coalitions of business, ethnic or educational groups and associations of community organisations (Badiru & Racz, 2013).	Some are involved in helping the poor as one of many activities, while others are created for the specific purpose of helping the poor (Badiru & Racz, 2013)
National NGOs	Include organisations such as the Red Cross, YMCAs/YWCAs and professional organisations (Lewis, 2014).	Assist local NGOs
International NGOs	Range from secular agencies such as Save the Children organisations, OXFAM, CARE, Ford and Rockefeller Foundations to religiously motivated groups (Lewis, 2014)	Activities vary from mainly funding local NGOs, institutions and projects, to implementing the projects themselves (Lewis, 2014)

There are several characteristics distinguishing NGOs involved in disaster management from those developed for other purposes. Unlike other NGOs, NGOs involved in the management of different types of disasters are developed to benefit people affected by these disasters, such as hunger, floods, earthquakes, hurricanes and other natural calamities. The main role of NGOs working in disaster management is to reduce human

suffering and restore normalcy in the region hit by the disaster. On the other hand, other NGOs may either work to support the disaster NGOs or for the benefit of the capital and labour contributors (Croom, Romano and Giannakis 2000).

Despite the fact that there are several NGOs participating in the process of disaster management, not all of them are involved in disaster response or recovery. Therefore, NGOs in disaster management can be distinguished by examining their operations and activities in a particular stage of the disaster management process. NGOs involved in disaster preparedness dedicate a great deal of their efforts to an analysis of disaster risks as well as the establishment of improved linkages with early warning systems. NGOs employ both structural and non-structural measures in disaster mitigation (Helbing and Kühnert 2003). Structural measures describe the construction of physical facilities, apparatus, equipment or the application of technology to avoid or reduce the possible impact of a hazard. Common structural measures may include the construction of dams, ocean wave barriers, flood levies and evacuation shelters. Non-structural measures, on the other hand, involve the use of knowledge, practice, or consensus, as opposed to physical constructions, aimed at reducing disaster risk. These measures are implemented in various ways including raising public awareness, providing training and education, and through the implementation of key policies and laws. Common non-structural measures may comprise land-use planning laws, building codes, public awareness programmes, and research and assessment efforts (PreventionWeb 2017). Mitigation use both structural and non-structural measures. In structural measures, activities such as the construction of community shelters and strengthening of flood embankments are carried out to reduce the losses caused by a possible disaster. Non-structural measures involve the use of non-engineered activities for a similar purpose (Helbing and Kühnert 2003).

Although there are several NGOs working in the process of logistics, every NGO has a single or few different roles to play in the entire process. Charitable NGOs work to meet the needs of the poor through various activities. These NGOs may be involved in the

distribution of medicine, food and clothing. They are also involved in the provision of transport, schools and housing. Service oriented NGOs are those that take an active role in the provision of services such as family planning, health or even education services. The beneficiaries are expected to assist the NGO in the implementation of the various programmes. Others are mainly active in the definition, planning and implementation of projects that make the supply logistics as smooth as possible. Other NGOs act as the donors to financially support the logistics and supply process in addition to playing the advocacy role (Gunasekaran and Kobu 2007).

4.4 NGOs' ethical considerations

It is a generally accepted fact that NGOs play an important role in promoting humanitarian issues, development aid and the needs of the disadvantaged, in addition to other major problems in society. However, in spite of their crucial role, there are ethical concerns in regard to the function of NGOs. There is a common belief that NGOs do, at times, influence other governmental and business organisations (Doyo 2012). These concerns are linked to the increasing presence of NGO agencies and the influence they attract at local, national and international levels. A key concern is the lack of accountability in the majority of activities implemented by NGOs, with some being linked to accounting scandals and libellous government officials. In addition, NGOs have been associated with non-desirable power struggles, which ruin their reputation and mandate. The massive rescue mission by NGOs, following the Asian Taiwan in 2004, is testimony to their power and influence. This relief effort also highlighted major concerns regarding opportunities for the abuse and misuse of humanitarian funds. The arrest of the NGO coordinator, in Indonesia, for alleged corruption raises further doubts about the level of accountability in NGOs (Transparency International 2005). Numerous case linking NGOs to corruption and other related scandals have also been reported globally. In 2012, for instance, 16 employees, including senior managers, of the Norwegian Refugee Council were arrested for corruption and mismanagement. In 2014, a senior official at Oxfam international in the UK was arrested for embezzling an

amount in excess of £64,000 (Sandbrook 2015). A number of NGOs in the USA have been accused of a lack of transparency, conflict of interest, questionable funding practices and the failure to implement the organisation's objectives (Doyo 2012). It is, therefore, important to develop and implement a more effective functional framework for NGOs aimed at enhancing transparency and accountability.

4.5 NGOs' activities in the Disaster Management Cycle

The goal of disaster management is to avoid or reduce the potential risk of loss of a hazard, to provide necessary aid to the victims, and to achieve a quick and effective recovery for those affected. The disaster management cycle shows the processes, the activities, and the key steps undertaken by NGOs in reducing the risks of a hazard, the initiatives undertaken during and following such a hazard, and the recovery effort put in place (Warfield n.d.). The activities in the cycle lead to better warnings, greater preparedness and reduced vulnerability in the subsequent iteration of the cycle. Appropriate plans and policies aimed at reducing the causes or the impact of a potential hazard on people, property or infrastructure are also included in the cycle. The cycle comprises four different phases, which overlap and have varying lengths depending on the severity of a disaster: mitigation, preparedness, response and recovery, all of which are discussed in the following sub-sections (Dimersaar Academy 2017).

4.5.1 Mitigation and preparedness (Pre-Disaster)

Pre-disaster management involves both mitigation and preparedness efforts. Mitigation measures aim at reducing or preventing the impact of a disaster. They differ from other phases in that they tend to focus more on long-term efforts for reducing a potential risk. Preparedness, on the other hand, entails the development of a proper course of action in light of an anticipated or a potential disaster. This phase involves planning, training, and

educational programmes and activities to increase the level of readiness to respond to any emergency situation that might arise (Warfied n.d.). NGOs involved in disaster preparedness dedicate a great deal of their efforts to an analysis of disaster risks as well as the establishment of improved linkages with early warning systems. NGOs active in disaster mitigation use both structural and non-structural measures. In structural measures, activities such as the construction of community shelters and strengthening of flood embankments are carried out to reduce the losses caused by a possible disaster. Non-structural measures involve the use of non-engineered activities for a similar purpose (Helbing and Kühnert 2003).

Table 4.3: NGOs' activities during pre-disaster stage (Helbing and Kühnert 2003)

NGOs' activities in Pre-disaster	General	Detail
1.	Risk awareness and evaluation	Includes hazard assessment and capacity or vulnerability analysis.
2.	Public commitment, as well as institutional frameworks	Includes legislation, organisational, policy and community action.
3.	Knowledge development	Include public education, research and training, as well as information.
4.	Early warning systems	Includes forecasting, broadcasting of warnings, preparedness procedures and reaction capacities.
5.	Implementation of measures	Includes environmental management, urban planning and land-use, protection of vital facilities, appliance of science and technology, collaboration and networking, and financial instruments.

Based on Table 4.3 above, it can be deduced that the pre-disaster phase is generally comprised of five categories of activities, which include risk awareness, knowledge development, public commitment, early warnings and implementation of measures (Helbing and Kühnert 2003). Risk awareness and evaluation refers to the assessment of a potential hazard in terms of causes and effects. Public commitment and institutional framework, refers to the design of key legislation, organisational policy and community actions aimed at reducing or preventing risks. Conversely, the goal of knowledge development activities is to increase the awareness and understanding of potential risks in order to reduce or avoid their possibility of occurring. They include activities such as training, research, information dissemination and public education (Helbing and Kühnert 2003). Early warning systems are red flags that alert NGOs of possible risks. The activities here include forecasting, broadcasting of warnings, preparedness procedures and reaction capacities. In contrast, implementation measures are more long-term and are inclined towards futuristic preventive efforts. They include activities such as environmental management, urban planning and land-use, protection of vital facilities, appliance of science and technology, collaboration and networking, and financial instruments (Helbing and Kühnert 2003).

According to the UN ISDR (United Nations International Strategy for Disaster Risk Reduction) (2005 p. 63), the pre-disaster phase may be considered to be the most important phase in the disaster management cycle. With the rare exceptions that have taken place, the incidence of disasters is technically predictable, even though their exact severity, timing or location is not. Consequently, a diversity of measures ought to be put in place in advance, particularly in regard to risk evaluation, mitigation or prevention, disaster preparedness and risk reduction. It should be noted that these measures are epitomised in the Hyogo Framework for Action 2005–2015. There is a close link between disaster preparedness and risk reduction. Risk reduction initiatives in the pre-disaster phase are usually concentrated mainly at the community level. These initiatives are in the conceptual framework of factors considered liable to reduce vulnerabilities, as well as disaster risks within a society, in order to avert or mitigate, and prepare, for the adverse effects of hazards, in the wider perspective of sustainable development.

The gains of preparedness and mitigation may appear obvious, but paradoxically they are hardly ever factored into limiting disaster strategies and approaches to the relief and development cycle. In practice, some scholars have argued that disaster mitigation and preparedness is considered a form of activity, instead of something inherent to sustainable development (Coppola 2010).

Technologies in early warning systems and education programmes must therefore be incorporated into NGOs' development projects that promote sustainable development in regions that are prone to disasters. However, this seems to be a weakness of this evidently ever-evolving sphere of knowledge. In addition, the time span involving instantaneous relief and post-disaster restoration necessitates re-evaluation, in addition to enhanced coordination among all parties involved. The NGOs that respond to natural disasters must be sensitive to the impact of their activities, both environmental and societal in the course of the transition period, which entails relief, rehabilitation and restoration. What distinguishes natural disasters from other disasters, for instance conflict, is that a re-emergence of the incident is practically inevitable. This presents a distinctive challenge to the mitigation efforts of NGOs. As a result, natural disasters require extra attention in the course of the period of transition in order to guarantee that strategies are in position for improving preparedness and reducing the vulnerabilities as a way of mitigation against possible subsequent occurrences. When nations fail to consider risk and vulnerability factors in their development plans, the result is large scale disasters eroding policies, strategies, economic development and social welfare, while demand is increased on national and global humanitarian assistance (Davis 2007).

Rocha and Christoplos (2001) expressed their criticism of the disaster management cycle employed by NGOs in mitigating risks. They asserted that there is a lack of consistency between the preparedness and the relief phase, thus, undermining continual and sustainable development in disaster management. In other words, since the cycle is a continuous process, which involves the progressive flow of activities in the management of a disaster, the lack of uniformity and lack of progression between the preparedness and relief phases, works to limit the effectiveness of the cycle as a whole,

thereby impacting negatively on long-term sustainable efforts. Figure 9 highlights the inconsistency between the disaster preparedness phase and the relief phase as highlighted by Rocha and Christoplos (2001). This, therefore, creates the need to review the current disaster cycle relied upon by NGOs, in an effort to ensure consistency across all phases, as a means of ensuring its effectiveness in promoting sustainable long-term development. Rocha and Christoplos (2001) have divergent views regarding the disaster cycle and maintain that there are no distinctive phases, or a linear progression that flows from one phase to another. This implies that there are no borders involving relief and development, and consequently, it is neither a cycle nor linear. There are emergency circumstances within continuing development, and it is important to employ an emergency response towards promoting long-term development; consequently, the two are entrenched in each other. A possible upgrade to this model may be a cyclical representation that illustrates the on-going incorporation that is fundamental to disaster management (see Figure 4.1).

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Figure 4.1: The Disaster Cycle (Rocha and Christoplos 2001)

According to Alexander (2002), the misunderstanding that surrounds disaster mitigation and preparedness regarding where it fits into the wider picture of relief and development has indeed contributed towards its failure to be mainstreamed. In the same manner, the drive to be at the forefront of humanitarian work or address poverty may always not be

felt within disaster mitigation and preparedness. Eventually, the coordination between NGOs and other stakeholders is essential for this area to be effectively managed. It also follows that outside the community level, coordination among government, NGOs and the private sector is necessary (Rocha and Christoplos, 2001). From this perspective, Merlot and De Cieri (2012) assert that there has been in recent times an increase in the level of coordination between NGOs, as evident in the development of prominent umbrella organisations, and the advancements in the SPHERE manual, International Federation of Red Cross and Crescent Societies Code of Conduct, to mention just a few. It is inherent in their character that NGOs require working with other agencies. In addition, linkages to academia, especially the scientific academic community, ought to be developed.

4.5.2 Response phase

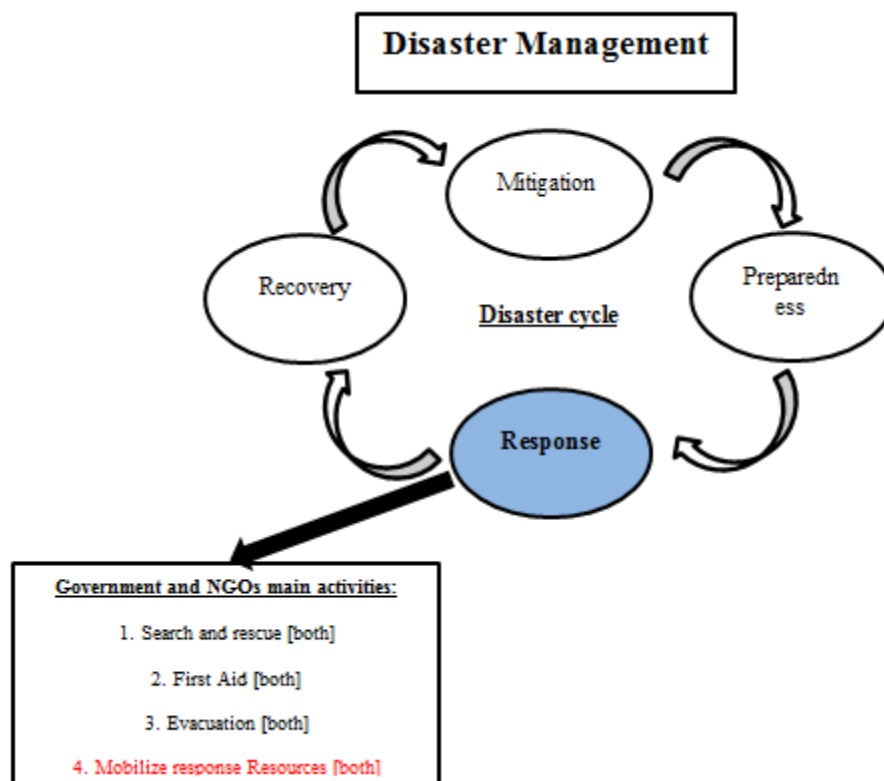


Figure 4.2: Conceptual framework—NGOs activities

The goal of emergence response is to provide urgent assistance to improve health, maintain life and offer moral support to those affected by a disaster. The assistance provided under this phase may range from more specific, but limited, aid to include the provision of shelter, transport and food, to the setting up of temporary settlements in camps and other ideal locations. It may, as well, involve the repair and maintenance of damaged infrastructure. It is worth noting that the main focus of the response phase is to meet the basic needs of the victims in the short-term until more long-term and more sustainable solutions are devised. This phase of the cycle is often highly represented by humanitarian organisations. In the event of rapid onset disasters, for instance earthquakes, the response phase might last from a several weeks to a few months. In the event of slow onset disasters, for instance droughts, the response phase might last for several months or run into a number of years. It is essential to note that response assumes the initial steps in the direction of recovery through evaluating damage caused to communities, institutions, infrastructure, industry and business, and through planning the requisite measures towards restoring these to their previous conditions or even better levels. Table 4.4 below shows the types of activities performed by NGOs in the response phase.

Table 4.4: NGOs' activities in the disaster response phase

Number	Activities
1.	Search and rescue
2.	First aid
3.	Evacuation
4.	Disaster Assessments
5.	Providing water and food
6.	Shelter
7.	Fatality management
8.	Sanitation
9.	Security
10.	Social services
11.	Resumption of critical
12.	Infrastructure
13.	Donations management

14.	Volunteer management
15.	Coordination

Several factors have been linked to a successful disaster response support. Essentially, these factors include flexibility, ownership, inclusion, accountability, transparency and speed (Alexander 2002). In addition, effective coordination between government and NGOs has been identified as a key factor in ensuring an effective and efficient disaster response team.

In the response phase, the government actively participates in coordinated activities and invites the military to carry out search and rescue. Therefore, during this phase, NGOs have to work closely with both the government and (sometimes) the military in order to conduct an effective and efficient disaster response (Christopher and Tatham 2014). Coordination is a vital and immediate component of disaster response because of the sheer numbers of agencies that quickly descend upon the impacted areas (Dube 2016). It is common in large disasters to see, in addition to the local, regional and national government response agencies, several hundred local and international NGOs, each offering a particular skill or service, while successful coordination and cooperation can and often does lead to many lives saved, much suffering alleviated, and the safe and efficient use of response resources (Coppola 2011).

As aforementioned, effective coordination between government and NGOs plays a crucial role in the successful implementation of disaster response projects. However, it is noteworthy that the relationship between the government/military and the NGOs involved in the humanitarian logistics and supply chain has greatly deteriorated in recent years (Nisha de Silva, 2001). Most NGOs have coordinated with the government/military in the course of executing their aid activities. However, this has been happening with varying degrees of caution as well as reluctance. NGOs in humanitarian logistics have not been able to devise an appropriate way of cooperating

with the government/military in the delivery of relief services. However, the role of the government/military in supporting the NGOs to deliver their services cannot be ignored. The government/military plays a vital role in protecting the workers from the NGOs during their missions (Nisha de Silva 2001).

Globally, NGOs work together with a number of other agencies in the provision of services in the various stages of disaster management as well as other areas where their services are needed. For example, governments of the host nations, neighbouring nations as well as the governments functioning in the international community activate the stream of humanitarian logistics when a disaster occurs. Donors are also important actors as they provide the main funding for main relief activities. Therefore, NGOs worldwide should have a good relationship with pre-determined donors. NGOS are also required to collaborate with various private companies. Some private companies have the ability to provide NGOs with technological support as well as logistics managers and staff (Beamon and Balcik 2008). They can also provide particular services whose availability on the ground may be scarce immediately after the onset of the disaster. The services may include banking support, postal services, engineering solutions and electricity supply.

4.5.3 Recovery Phase

According to the Disasters Emergency Committee (2010 p.94), the post-disaster phase entails actions in regard to areas such as recovery, rehabilitation and reconstruction. This phase also presents opportunities for developing disaster risk reduction measures that may be put in place in the subsequent pre-disaster phase. Recovery activities continue until the situation at hand improves or returns to normal. It is noteworthy that the goal of recovery efforts, both in the short and long-term, is to return the situation and life support systems to minimum operating standards. There are a number of activities involved in this phase including re-establishing basic conditions such as temporary housing, implementing self-care measures and the provision of external

support such as loans. Table 4.5 illustrates the activities implemented by NGOs during the recovery phase.

Table 4.5: NGOs' activities during recovery phase (Clinton 2006)

	NGOs' activities during recovery phase
1.	Decisions, as well as actions executed following a disaster with the intention of reinstating or advancing the pre-disaster conditions of those living in the affected community. This goes together with encouraging, as well as facilitating required adjustments towards reducing disaster risk.
2.	External support, for instance loans to governments, agricultural resources, technical assistance and assistance towards revitalising businesses.
3.	Re-establishing the necessary basic services that facilitate life, to get back to normalcy.
4.	Rebuilding homes, as well as industry. This is linked to the re-establishment of economic and social development. At this stage, it is important to design buildings which can survive future disasters.
5.	Initiatives focused towards facilitating communities to care for themselves. These measures require being particularly accessible to persons at greatest risk. These include the poorest, as well as the most vulnerable persons in a community.

According to Clinton (2006), the post-disaster recovery phase is best pursued through the development of existing institutions, or through formulating time-bound professional bodies which have the single mandate of implementing short- to medium-term restoration undertakings. It is complex to create efficient fresh institutions in the after effects of a disaster, except for where their mandates and duration are clearly defined. In the Lanka Tsunami Emergency Recovery Program in Sri Lanka, the formulation of new institutional structures in the after effects of the disaster to execute restoration efforts presented key challenges. These challenges involved the capacity of the new institution to undertake the restoration task in a short duration as well as its

sustainability. In this context, the Reconstruction and Development Agency in the country acquired a significant amount of financial support from donors and international NGOs yet failed to build capacity to an optimum level. Consequently, its functions were transferred to the Ministry of National Building and Estate Infrastructure Development. A different state of affairs emerged in Pakistan concerning the Earthquake Reconstruction and Rehabilitation Authority that was established following the earthquake of 2005 (Malik, Salma and Krishna 2008). The institution performed effectively in the development of capacity, and in its efficient response to the disaster. An aspect that contributed to its achievement was that the institution was created with a time-bound and unambiguous mandate, in addition to being staffed through government resources. However, it was also provided with supplementary key specialists hired through international NGO facilitation. It was, consequently, perceived to be a government-led, although donor-assisted, body having the complete backing of other government agencies (Clinton 2006).

Benson and Clay (2004) assert that a community-driven system to recovery and restoration can considerably assist in building up local capacities necessary for upcoming project identification, planning and implementation, in addition to post operation and maintenance activities. For instance, in a study conducted by the World Bank (2009 p. 201), in the Cyclone Emergency Recovery Program in Samoa, it was demonstrated that the amount of community grants employed towards identifying, planning and executing structural and non-structural solutions should not be large. However, the participatory process through which suitable solutions were established in order to ensure ongoing community commitment in providing supplementary resources, in addition to ensuring that the resources developed were preserved and well utilised following the project's closure, proved to be increasingly essential in this programme. It should be noted that government ministries had important roles to play, either directly via their structures, or via NGOs, or both. Contrary to the Samoa project, the Tsunami Emergency Recovery Program in Sri Lanka was hindered by insufficient social mobilisation (World Bank 2009). Although in its housing programme, the provision for development of community rehabilitation committees was provided, there is little

evidence that this was extensively put into practice, or that the local rehabilitation committees extensively participated in mobilising communities. In this context, NGOs that engaged in this programme failed to utilise social mobilisation as a key focal area, other than concentrating on contractor-driven restoration in line with a donor-led housing programme. This facet of the programme in Sri Lanka demonstrates that dissemination of information and social mobilisation require consideration as priority components to guarantee that all prospective beneficiaries have the chance to benefit from NGO support (World Bank 2009).

According to the World Bank (2009), the Gujarat Emergency Earthquake Reconstruction Project in India is an endeavour that demonstrates that when NGOs, in their disaster management and response undertakings, prioritise transparency, accountability and equity, even in complicated emergency circumstances, the target goals can be realised. However, this is only practical in the event that appropriate measures are planned and integrated as fundamental components of the overall intervention. This project, through international NGOs, supported the restoration of more than one million houses. It should be noted that this was accomplished with minimum grievances and claims of fraud, reflecting the effective integration of transparency and the needs of the local communities. Telford (2007 p. 97) argues that accountability and transparency are important for every institution that provides assistance. Correlation among the programmes of dissimilar international stakeholders is also critical. In the event that communities with parallel needs are treated in a different way by different programmes, it is likely that major problems will arise in the programme. It is from this perspective that accountability towards the affected communities becomes a foundation of good coordination practices.

4.6 Challenges of NGOs regarding task delivery during the disaster response phase

The NGOs working in humanitarian logistics are faced with a number of major challenges. Among these challenges are a failure to recognise the importance of logistics and a lack of qualified staff. Additionally, a lack of institutional learning, inadequate utilisation of technology and limited collaboration are other key challenges facing these NGOs (Bagchi, Skjoett-Larsen and Soerensen 2005). In addition, there seems to be confusion between programmes and support services, particularly in the implementation of NGO goals by senior managers. Activities in the programmes category should include the front-line activities relevant to relief and development. The programmes category also includes the provision of services such as sanitation, water and food. Support services are the activities directed towards the support of front-line activities. They include, but are not limited to, human resources, communication finance, technology and logistics. However, according to Helbing and Kühnert (2003), there are times when programmes are confused for support services, resulting in a conflict of functions. Furthermore, a number of humanitarian logisticians do not focus their efforts on short-term direct relief, but rather invest their time and resources in processes and systems meant to reduce expenses. This explains why there is no adequate funding for logistics and its support services. Leaving the people with control of the budget to make decisions during relief operations, coupled with the failure to include a logistician, is another related challenge (Helbing and Kühnert 2003).

The high intensity of relief efforts, coupled with high turnover and the fact that the disaster response is oriented to the crisis, eliminates institutional learning from the relief environment. Aid workers are not given ample time to reflect on the lessons learnt from previous missions. Reflection time between disaster management missions can allow the aid workers to make improvements where necessary before the next mission. Limited collaboration has crippled NGOs in the area of humanitarian logistics for a number of years. This has been facilitated by the emergence of competition for donations among the main relief NGOs, giving rise to an environment characterised by

battles and little collaboration. Despite the heads of logistics knowing each other and facing similar challenges, they only meet when disasters occur (Jahre and Jensen 2010).

4.6.1 Challenges faced by NGOs

NGOs face a number of challenges in their attempts to achieve their objectives. The following are some of the major challenges they face.

i) Lack of professional staff

A majority of NGOs have inadequately trained staff, which has a negative bearing on how they respond to disasters. Compared to other non-governmental agencies, where continuous professional training and development takes place, there are limited employee training and professional development programmes within most NGOs. When a disaster occurs, research shows that some NGOs are forced to recall their experienced and trained staff from active relief missions to manage the new disaster (Christopher and Towill 2000).

ii) Inadequate skill sets among a majority of NGO workers

Humanitarian intelligence is a mandatory skill in the humanitarian sector due to the political complexity of most emergencies. New skills are required for people working in humanitarian NGOs, which allow them to operate effectively. A great deal of the emergency aid reaches the beneficiaries through negotiated access, making political analysis and humanitarian intelligence very important factors in the success of the

supply chain. The personnel should have enough skills to be able to gather accurate information from people under control of every disaster area. NGOs should also have a group of personnel with the ability to develop a clear report about the actors ready to negotiate with the organisation, in addition to determining their interests, bottom lines, positions and intentions (Christopher and Towill 2000). This has proven to be very important in helping humanitarian NGOs negotiate access to important resources through the use of appropriate strategies and tactics. In addition, the development of humanitarian intelligence allows NGOs to develop appropriate language skills that dovetail with diverse cultural groups and political landscapes. All these analyses, coupled with the analysis of the effects of the aid on the beneficiaries are important tools for the NGOs to come up with the best humanitarian response to every crisis.

It is worth mentioning that the development of necessary humanitarian knowledge and intelligence in addition to analyses of local changes and dynamics of a certain conflict will give the NGOs a good chance to develop appropriate responses with the potential to reveal the various ranges, objectives and types of diplomacy in the humanitarian sector. Despite the fact that all the NGOs in the humanitarian supply chain and logistics have the common mission of responding to humanitarian need, their missions should also focus on other objectives that address the various needs of the target population. Furthermore, the professionals should be highly skilled to allow them to provide responses that have a durable impact. Therefore, the skills required by the NGOs in all the sectors should not only make the humanitarian workers experts in the provision of health, food and relief services, but the training should also allow them to achieve the secondary objectives of these organisations: Violence reduction, generation of human rights violations reports and participation in peace building initiatives. As a result, the organisation's capacity to promote peace in the societies affected by a crisis increases (Cooper, Lambert and Pagh 1997).

Humanitarian workers should receive training to allow the NGOs to uphold human rights. The need for particular training has increased due to the increasing number of human rights atrocities in various regions. NGOs in the humanitarian supply chain and

logistics are also in great need of skilled workers to contribute to the investigations conducted on human rights violation. Workers should be skilled enough to deal with the issues that arise between the political humanitarian players and their employers. The issues mainly arise due to the fact that most human rights monitoring initiatives may be viewed as 'political' instead of 'humanitarian'. It is prudent for the aid workers to firmly maintain the human rights regardless of the effect this stand will have on their NGOs' relationships with the political players (Dynes 1994).

Despite the fact that the monitoring of human rights is vital for the elimination of human rights violations, NGOs involved in the humanitarian supply chain and logistics are required to employ individuals who can respond to propagandist messages, in order to avoid incitement. In such regions, aid workers should use their skills to communicate messages of peace to counter messages of violence and hatred. For example, United Nations agencies are good broadcasters of peace messages through the BBC World Service in Cambodia and Afghanistan. The ability to conduct evaluations is another important skill valued by NGOs in the humanitarian supply chain and logistics. Evaluations are important in this case because aid workers should be accountable not only for their actions and demands of the target population, but also due to the increasing economic, political and social effects of humanitarian assistance on the target society (Ebersole 1995).

iii) A lack of proper coordination and communication between NGOs and the military

It has been noted that the relationship between NGOs and the military has gradually deteriorated in some countries in recent years (Davidson et al. 1996). It has been reported that most NGOs have hardly coordinated with soldiers in the course of executing their aid activities. NGOs in humanitarian logistics have not been able to come up with an appropriate way to cooperate with the military in the delivery of relief

services. However, the role of the military in supporting the NGOs to deliver their services cannot be ignored. The military plays a vital role in protecting the workers from the NGOs during their missions (Nisha 2001).

Globally, NGOs work together with a number of other agencies in the provision of services in the various stages of disaster management and other areas where their services are needed. For example, governments in host nations, neighbouring nations and functioning in the international community, activate the stream of humanitarian logistics when a disaster occurs. Donors are also important actors as they provide the main funding for main relief activities (Wassenhove 2006). Therefore, NGOs globally should have good relationships with pre-determined donors. NGOs are also required to collaborate with various private companies. Some private companies have the ability to provide NGOs with technological support, and logistics managers and staff (Beamon and Balcik 2008). They can also provide particular services whose availability on the ground may be scarce immediately after the onset of the disaster. The services may include banking support, postal services, engineering solutions and electricity supply.

The high intensity of relief efforts, coupled with high turnover and the fact that the disaster response is oriented to the crisis, eliminates institutional learning from the relief environment. Aid workers are not given ample time to reflect on the lessons learnt from previous missions. Reflection time between disaster management missions can allow the aid workers to make improvements where necessary before the next mission. Limited collaboration has crippled NGOs in the humanitarian logistics area for a number of years. This has been facilitated by the emergence of competition for donations among the main relief NGOs, giving rise to an environment characterised by battles and little collaboration.

iv) Under-utilised IT platforms to coordinate and share information across NGO agencies

There is a compelling need to increase the current utilisation of IT platforms in coordinating as well as in sharing information across NGO agencies. Currently, IT platforms are at the centre of most operations undertaken by NGOs. However, it is important to increase the reliance and utilisation of more advanced technologies in order to enhance information and resource sharing. Other strategies include the standardisation of training and certification and concentrating on the measurement of metrics and performance. All the players working together with NGOs in disaster management, including governments, donors and private companies should do their best when it comes to information sharing and collaboration (Moe et al. 2007).

Additionally, there is an essential need for consistent meetings that bring a community of information and resources together to increase the acknowledgment of the major function of the humanitarian logistics. For the last three years, for example, the Fritz Institute has held the annual Humanitarian Logistics Conference. Such conferences encourage high-level logistic managers from various aid agencies to share knowledge in addition to fostering initiatives in matters of common interest including training, information technology and performance management. There is also a great need to ensure that there is standardised staff training (Mwenja and Lewis 2009). Equipping the NGO staff with relevant skills will enable them to achieve the objectives set by their employers in the humanitarian sector. There are various benefits from comprehensive training specific to this sector. The training improves communication and cooperation among the NGOs, due to the standardised catalogues, processes and terminologies. Furthermore, job satisfaction and career mobility for all the NGOs in the sector are increased. The training also allows the development of a pool of logisticians with externally verified skills. This provides room for donors and agencies to hire their staff in a more flexible manner (Ebersole 1995).

Organisations concerned with relief missions have overemphasised the management of the disaster and neglected the need for performance measurement. It is therefore necessary to ensure that performance measurement is not done only when there is a disaster, but rather through a well-structured process that incorporates continuous task improvement (Dynes 1994). Since backbone information systems are being developed by many organisations, there is increased potential for performance measurement in all operations and the use of measurement information in ways similar to the information use in the corporate world. Proper use of metrics will allow the NGOs to use actual performance to plan the way forward in addition to identifying and eliminating factors that cause performance breakdowns (Neely, Gregory and Platts 1995). The organisations need to use the analysis of current performance to direct constant process improvement, and inform all the players involved in the humanitarian logistics of the strategic importance of this field. There is also a need to overcome the technology challenge through the development of flexible solutions in technology. This will improve the process of procurement, distribution and tracing of funds and goods. There is a great need for better technologies with the potential to increase the flexibility and robustness of reporting and connectivity in the field (Croom, Romano and Giannakis 2000).

4.7 Summary

This chapter reviews the fundamental knowledge of NGOs by reviewing literature reviews and further summarizes the different roles, tasks, and operations of different types of NGOs during each disaster cycle phase. On this basis, through reviewing the literature review, further examined and investigated the various challenges that NGOs have in disaster response stage.

Chapter 5 Supply Chain and Humanitarian Supply Chain

5.1 Introduction

The number of disasters around the world has significantly increased, but there are still relatively few published papers that have sought to improve the understanding of the nature of the supply chain management (SCM) of humanitarian aid under disaster conditions (Roh et al. 2008).

The requirement to improve the humanitarian supply chain has recently received increased attention, due to the perceived failures in aid delivery systems following major crises (Fritz Institute 2005). The humanitarian supply chain is often treated as a series of discrete activities disconnected from each other and there is often a weak (or non-existent) connection between each stage in the delivery of aid (Taylor and Pettit 2008; United Nations Development Programme – (UNDP), 1993). Kovacs and Spens (2007) however, suggest that this is now changing. Ho et al. (2002) recognised that such problems exist in the understanding of commercial supply chains and there is no reason to believe that the level of understanding of humanitarian supply chains is any different. Little effort has been put into developing a sound theoretical basis underpinning how the supply chain management for business differs from the humanitarian supply chain.

5.2 Supply Chain Management

The concept of supply chain management began way back before the industrial evolution; and has been applied to a wide range of fields. Figure 5.1 illustrates the classic supply chain which consists of the flow of material, information, money and

services from raw material suppliers through factories and warehouses to the end customer (Houlihan 1985; Arndt 2004; Mentzer et al. 2001; Lambert and Cooper 2000; Christopher 2005; Christopher 2016; Tan 2001; Stadtler 2015). In general businesses, the supply chain links the sources of supply (suppliers) to the owners of demand (end customers) (Wieland and Wallenburg 2011). The ultimate goal of any supply chain is to deliver the right supplies in the right quantities to the right locations at the right time. Supply chains comprise of all the activities and processes associated with the flow and transformation of goods from the raw material stage through to the end user (Beamon and Balcik 2008). Supply chain management has been used by both profitable-industrial and non-profitable-humanitarian organizations.

Historically, researchers and practitioners have focused more on profitable and industrial organizations as these commercial supply chains apply optimal decision making and efficiency in terms of costs and resources (Basu 2012).

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Figure 5.1: Supply Chain process (Vorhies 2015)

5.2.1 Logistics

Among these processes, logistics is the most important. Logistics is that part of the supply chain process that plans, implements, and controls the efficient, effective flow and storage of goods, services, and related information from the point-of-origin to the point-of-consumption in order to meet customers' requirements (Christopher 2016). Thus, logistics is an important part of the supply chain. From literary research, the word 'Logistic' in China first appeared in the chapter 'Gao Zu Ben Ji' from the book "Shi Ji" which describes the winning strategies and tactics of the first battle of The Han Dynasty. It means strategy, strategy planning and control during military action. From the history of western countries, the word logistics came from the Greek 'logistikos' and French 'logistique', meaning logical concept and skill in calculating (Russell 2000), and until more recent times had only been used in a military context.

According to Christopher (2016), logistics is the process of strategically managing the procurement, the movement and storage of materials, parts, and the finished inventory through the organization and its marketing channels in such a way that current and future profitability are maximized through the cost effective fulfilment of orders. Ultimately, the mission of logistics management is to serve customers in the most cost effective way.

Under the complexities of modern society, the meaning of logistics extends to suit the needs of people from different groups and organizations. From the perspective of business logistics, it is defined as a planning framework for the management of materials, services, information, and capital flows (Rushton, Croucher and Baker 2014). Logistics also includes the increasingly complex information, material, communication and control systems required in today's business environment. In relation to humanitarian issues, Thomas and Mizushima (2005) define it as "the process of planning, implementing and controlling the efficient, cost-effective flow of and storage

of goods and materials”, associated with “information, from the point of origin to the point of consumption for the purpose of meeting the end beneficiary’s requirements”. For humanitarian aid needs, logistics is the process of helping vulnerable people affected by disasters, including mobilizing people, and providing skills and knowledge (Wassenhove 2006).

It is noted that, in the disaster management and humanitarian relief context, the meaning and function and operations of the supply chain and logistics are quite different. The next section provides details about logistics in the humanitarian supply chain context.

5.3 Humanitarian Supply Chain Management

In contrast, research on humanitarian supply chains is about 15 years behind that of commercial chains (Wassenhove 2006). For years, humanitarian logistics has been struggling for recognition. It has been locked into a vicious circle with a lack of understanding regarding its function and importance.

The humanitarian supply chain refers to the network created through the flow of supplies, services, finances and information between donors, beneficiaries, suppliers and different units of humanitarian organizations for the purpose of providing physical aid to beneficiaries (Wassenhove 2006; Tovia 2007; Mentzer et al 2001). Thus, the supply chain when used for relief purposes is the ultimate sense-and-response chain (Lee and Lee 2007). Once a disaster occurs, an aid agency sends experts to complete an initial assessment of the extent of the damage and the number of people affected. This assessment forms the basis for an appeal that lists the specific items and quantities needed to provide immediate relief to the affected populations. Emergency stocks of standard relief items are then sent from the nearest relief depots and warehouses (Christopher and Tatham 2014).

A typical humanitarian supply chain procedure could follow the sequences described in Figure 5.2 which describes a multilateral approach through international agencies and NGOs. Although it is noted that aid is often given on a bilateral country-to-country basis, and delivered in a number of ways. Unlike most business supply chains, the humanitarian aid supply chain is often unstable. Sometimes, the supply chain breaks down at the receiving end (Munslow and Brown 1999; Stewart 1998; Byman et al 2000), but it may also be unstable at its origin for two main reasons: politicised donations by governments and the competitive nature of fund-raising from private donors (Ebersole 1995; Oloruntoba and Gray 2002; Bennett and Daniel 2002).

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Figure 5.2: A typical humanitarian supply chain (Oloruntoba and Gary 2002)

Due to these variations, Figure 5.2 is modified based on information and collaborative methods with the result shown in Figure 4. Local NGOs have become the central of the relief, because the flows in Figure 5.2 only make sense when a project base is applied, i.e. one NGO matches with one community. On the other hand, when a disaster happens in China, the Central Government will mobilize all the relief carriers and goods to the disaster spot to carry out the relief work, therefore, local NGOs will become a vital component of the response phase.

Figure 5.3 below indicates that the information and collaboration among different organizations require flows in both directions. Governments and NGOs are the key participants in a humanitarian supply chain. Governments have the primary power and the ability to prevail over military and economic considerations and their decisions directly affect supply chain processes. Donors, the public, and private organizations also play very significant roles in the humanitarian supply chain. The influences from donors help to increase both the accountability of humanitarian organizations and the transparency of the entire supply chain (Wassenhove 2006).

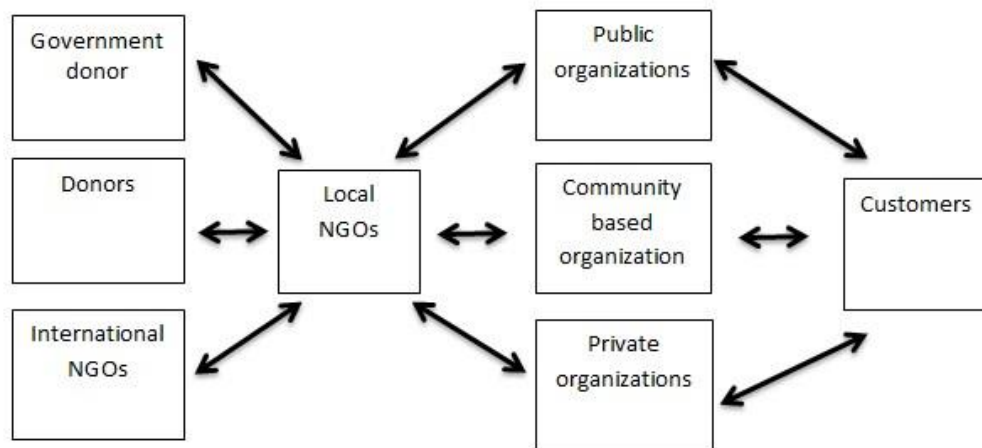


Figure 5.3: Networks between NGOs and stakeholders

McLachlin et al (2009) has described that the humanitarian supply chain is very unstable. Unlike the business supply chain, humanitarian aid supply chains can occasionally break down even at the receiving end (Munslow and Brown 1999). There are two main reasons for this instability, the first is governments raising political funds, and the second is fund-raising from private donors (Ebersole 1995; Oloruntoba and Gray 2006). It is extremely easy for political and military factors to influence the humanitarian supply chain, because as researchers have shown, both of them control the main power and have full control over the whole chain. Additionally, the lack of a positive collaboration among the military, governments, and NGOs can also cause inefficiency within the humanitarian supply chain. Furthermore, the majority of donors

are more willing to donate funds directed towards immediate relief goods such as water, food, and tents rather than have their funds used for the improvement of indirect services, such as relief equipment, information systems, and preparedness training (Oloruntoba and Gray, 2006; Wassenhove 2006; Kovacs and Spens 2007).

Humanitarian supply chains contain many functions, including preparation, planning, procurement, transportation, storage, tracking and tracing, and customs clearance (Thomas and Kopczak 2005). The aims of humanitarian logistics are to alleviate suffering and to rescue lives through the delivery of tasks of all kinds. And the definition of the humanitarian supply chain is extensive, and it will respond more actively in response to the stakeholder supply chain. Moreover, the aim of humanitarian logistics is to save lives and to alleviate suffering. All of which means that the definition of the humanitarian supply chain is more extensive and it has to respond to a greater range of activities than a more commercial stakeholder supply chain.

Calls are made to traditional government donors and the public and at the same time commitments for cash and/or in-kind donations secured. Suppliers and logistics providers are activated depending upon the severity of the disaster and then the necessary mobilization of goods and materials begins from, if necessary, across the globe. The government and military are very often the first organizations to receive information relating to disasters, and therefore, they are frequently the first organizations to initiate rescue operations and to inform other relevant organizations so that all the available personnel and resources can be assembled and directed to the location of the disaster (Christopher and Tatham 2014).

When supplies arrive, local transportation, warehousing and distribution have to be organized. These are usually complicated feats to accomplish, given the remote places in which disasters tend to occur, and are associated with the uniqueness of the requirements for each disaster in terms of both expertise and materials. Consequently,

the disaster site is very often in a complete state of chaos and helpless terror (Thomas and Kopczak 2005).

Physical infrastructures, such as roads, railways, bridges and airports, are often destroyed. National and local governments through humanitarian organizations must coordinate their activities, although they may be severely impacted, and even uprooted in the case of a conflict situation. Transport capacity may not exist or become extremely limited.

5.3.1 Challenges in the Humanitarian Supply Chain

There are various players in humanitarian aid chains including the United Nations, military, commercial and non-governmental organizations, donors to support NGOs, but their benefits come at a price. Donors demand to know where and how their funds are being used by enhancing money awareness and to see tangible, measurable results (Oloruntoba and Gray 2009). When international non-governmental organizations fail to achieve efficiency, this will not only cause loss of life, but will lead to the loss of crucial donor funds in the future. Under these circumstances, resources come under further pressure, conflict levels rise and performance dives (Roh et al 2008; Perry 2007).

In response to a disaster, NGOs must quickly build the very complex supply chains required to assemble and distribute food, shelter and other necessities to the same levels of efficiency as in commercial supply chain management. An NGO's supply chain involves the planning processes, implementation, and controlling the materials needed to introduce efficient, cost-effective flow systems, and the storage of information (Thomas and Kopczak 2005). This includes implementation at different stages of preparation, planning, procurement, transportation, storage, tracking and tracing, and customs clearance. The activities follow the entire supply chain from the very beginning

to the ultimate point of consumption in order to improve the situation of those affected by the catastrophe. NGOs' supply chains also have unique challenges because they are different to business supply chains as the demands on a humanitarian supply chain demand cannot be fully anticipated before the event (Long and Wood 1995). Throughout the world, disasters can and will happen anytime and anywhere and will often occur in economically underdeveloped areas. Most underdeveloped countries share two common issues - poor infrastructure and political instability, and they invariably require a combination of military and commercial applications to offset these problems. Thus, the requirements of supply and demand cannot easily be evaluated (Wassenhove 2006).

The concept of commercial supply chain management can be copied and used among NGOs (Kovacs and Spens 2007). Supply chain management is always applied as a support function and comes under the charge of a NGO and management as the "back office" (Thomas 2003). This has led to the exclusion of supply chain managers from critical decisions and failures to recognise the potential contributions of effective supply chain management and investment in the area (Wassenhove 2006). In order to fill the gap, it is necessary to establish a strategic alliance between all contributing humanitarian aid organizations in order to coordinate the humanitarian and comprehensive relief network strategy (Winter 2009). The humanitarian supply chain has a high level of unique and complex needs, therefore it requires more human intervention, and during the response phase it must be quick to implement innovative solutions to ensure the initial purpose of lifesaving (Gattorna 2006). According to Gattorna (2009), it is only through one completely flexible supply chain that it is possible to cope with unpredictable events and obtain a satisfactory result without considering the cost, or the use of relationships.

The goals of any international relief and development operation are supposed to be built on a supply chain which enhances its effectiveness and efficiency (Petit and Beresford 2005), or the need to take a planned strategic policy, rather than a "what needs to be" method (Gattorna 2009). Despite this, the demands of humanitarian aid are unstable and

unpredictable, which results in the needs for flexibility. This shows that the concept of agility can be applied to the humanitarian supply chain as proposed by Oloruntoba and Gray (2006).

5.3.2 Comparing the humanitarian with the business supply chain

Although both are supply chains, but the aims the humanitarian and business supply chains are vastly different. The aim of the humanitarian supply chain is to save lives in the shortest time and without concern for expenditures during first 72 hours after an event has occurred. The aim in the commercial context is to apply resources to minimize the production cost and increase productivity. To some extent, different aims can reflect different operations and functions. Thus, it is important to understand the differences between both chains.

The humanitarian supply chain is vital to humanitarian relief aid as illustrated in earlier sections, and it consumes more than 80% of the expenditure of all relief funds (Wassenhove 2006). It is also associated with some major issues. In business, logistics can be used to easily address the challenges; however, it is very hard to do so in humanitarian logistics (Wassenhove 2006; Christopher and Tatham 2014).

The use of the word ‘customer’ in the context of a humanitarian supply chain is different from that of the business supply chain. In the case of the humanitarian supply chain, customers are more likely to indicate those who are victims. While in the business context, the supply chain is related to the process of the transfer of materials or supplies towards the end customers. Beamon and Balcik (2008) state this process is linked to the flow of raw materials to the end user. As for any type of supply chain, it is aimed at delivering the right supplies in the right quantities to the right locations and right people at the right time and at the right price. Therefore, the humanitarian supply

chain flows as a relief measure from the donors to the customers (Beamon and Balcik 2008).

There are many similarities between humanitarian logistics and enterprise logistics, but in comparison to the best practice from the enterprise world, humanitarian organizations still lag behind. Humanitarian logistics seeks to deliver services and relief aid to people who are suffering for any kind of disasters, in order to alleviate human suffering under the prior conditions of the necessary response speed.

- **Customers**

Although the commercial and humanitarian supply chains share aspects in common, they still have very distinguishing parts and differences. Balcik and Beamon (2008) identified that the key difference between them is the identification of the customer. In commercial supply chain management, the customer is simply and clearly defined as the one who receives the goods and services while fulfilling the profits based on the customer service promises (Ramsden 2014). Wassenhove (2006) points out that there are two debates going on - the first defines customers as the providers of funds or supplies that the relief organizations deliver, the so-called donors; the second are the people who reap the benefits from the relief organization, i.e. the beneficiaries. The quote below provides an evaluation of the customer to donor.

‘The customers in the relief supply chain are the aid recipients. It is important to note that donors play such a large role in the humanitarian relief sector that the vast majority of NGOs currently regard donors (not aid recipients) as customers (Balcik and Beamon 2008). From this perspective, the NGOs manage a service chain, providing the service (for donors) of delivering aid-to-aid recipients.’

Above all, the beneficiaries in the business world are those who receive the goods and services; however, in the relief world, the victims are the beneficiaries. The victims do not have any or at best have a little power or discretion to determine what, when, where or how the relief goods are going to be delivered. Most importantly, they do not pay for the goods and services. On the other hand, the donors are the ones who directly or indirectly pay for these goods and services, because they are the people who pledge sometimes many millions to provide the funds to operate this relief work. Therefore, the NGOs will try to respect their wishes to spend the money well, so that the donors will be well satisfied.

- **Unpredictable demand**

Humanitarian relief supply chains are highly uncertain about if and when a disaster is going to occur, as disasters can happen anywhere, at any time (Dash et al 2013; Scholten, Scott, and Fynes 2010). The victims' needs, demands, and the supply from donors are also uncertain. Even then, there is the likelihood of a risk assessment programme being introduced and with its impact uncertain, everything is about possibilities, but rarely about certainties. Disasters always occur suddenly, and therefore, the demand on any humanitarian supply chain is highly uncertain (Wassenhove 2006).

- **Short lead time**

Disasters usually occur very suddenly, thus, the supply chain needs to provide a large number and variety of relief goods and services within a very short time after the event, because the speed of response is the prerequisite in this field and is the key to the rescue activities during the first three days. Consequently, it is extremely difficult to deal with this suddenness of demand for large amounts of a wide range of product and services.

The challenges of obtaining relief supplies and delivery timeliness are difficult to control during an emergency (Kirstin et al 2010). These include two areas: first, the internal relief logistics distribution centre, known as the relief supply phase, and second, the outbound logistics from the relief distribution centre to the affected area (called the aid distribution phase). The main task of the relief stage is to identify multiple vendors to obtain supplies, whether internal or external, which is known as the relief distribution stage, and seeks to help the distribution centre. Therefore, the corresponding operational issues may spring from difficulties associated with non-identified supply sources, as well as the coordination of disaster relief to provide a quick response to the affected people. As a result, the delay between when the relief demand becomes acute and when the corresponding relief is assigned turns out to be rather uncertain. It is noted that such a delay could be similar to the delivery time committed for purchasing and order processing solutions in the commercial operations of logistics (Simchi-Levi et al. 2000). By comparison, the purpose of the relief distribution phase is to direct relief delivered from the distribution centre to the disaster spot area, in order to meet the urgent demands of the victims. Among the remainder, the reliability of the damaged and affected infrastructures in the affected area may increase the uncertainty in the rescue distribution environment, and therefore lead to further complexity and difficulties in the amplification time stream-based emergency control.

- **Lack of initial resources**

The lack of initial resources draws the attention of not only the world-wide media but also donors. The need is to deliver large quantities of goods and services over a very short period (Perry 2007). This situation is most obvious during the initial response phase. On the other hand, the commercial field does not have these issues, as the demand and supply are predictable under the principles of a market economy.

In business logistics operations, under appropriate corresponding operational resources, such as the container, model and server, these are known and easily controlled logistics providers. Emergency logistics operate under a complex operating environment, where it is uncertain whether the necessary resources can be obtained from the public and private sectors. Lyle (2005) believes that there is always an intense need to coordinate the logistics resources of the public and private sectors, in order to avoid the arbitrary allocation of resources to escape a disaster. In addition, communication failure between suppliers, the logistics server, and demanders is another factor that impacts on resource coordination under emergency conditions.

- **Duplication efforts**

Furthermore, relief work includes a wide range of goods and services that can meet the fundamental needs of victims in catastrophic circumstances, such as shelter, food, water and medical care. Each organisation might specialize in one particular area, such as construction or medical care. However, it is inevitable that there will be duplication of effort and shortages in any disaster. In contrast, this situation never occurs in the commercial field, where the operation process is fully developed, and each department is in charge of one particular area, and there are not cross sector activities among the different departments (Ross 2004).

- **Accuracy**

The essential relief requires real-time information, however this is almost inaccessible. In the real world, this issue is derived from the facts that the relief requirements (such as communication, and the affected persons), and the corresponding information providers (such as on-site reporters and aid workers) may be inconsistent. Customers provide demand information in business logistics only very directly. On the other hand, demand information in humanitarian relief work can be very limited, unreliable, and

uncountable, especially in the immediate aftermath of a disaster (Rushton, Croucher and Baker 2014). In the case of most disasters, the needs for relief may be unknown, meaning that the timely provision of the relief to the people affected may not be possible (Blaikie et al 2014). The information needed for emergency relief is the total demand for logistics, rather than the total demand for conventional treatment as in business logistics. To some extent, demand information for relief is difficult to predict, due to the lack of historical data. Therefore, this leads to the challenging problem which is to provide real-time information to forecast a disaster (Cuzzolino 2012).

This comparison provides fundamental knowledge about both chains, and creates a space for identifying the critical successful factors in the humanitarian supply chain compared to the commercial supply chain.

5.3.3 Critical Success Factors (CSFs)

The humanitarian supply chain is often the largest and most complex part of humanitarian relief operations (UNDP 1993) and in order for successful supply chains to be effective and efficient, there is the requirement for a clear understanding of the problems and issues involved. Improving supply chain effectiveness and efficiency requires the uncertainty to be reduced, minimised, or even eliminated, but in many business cases this may not be completely achievable due to the product involved (Mason-Jones et al. 1999; Christopher and Towill 2001). Such problems are exacerbated in a humanitarian aid context when the products become relief goods destined for communities of people either distressed or displaced as the result of a crisis outside of their control, and through which the supply chain will inevitably have to operate. Developing an understanding of which factors are critical to the success of humanitarian supply chains, and whether the same factors emerge in all crises, is important. It is apparent that, as with commercial supply chains, there are certain key factors which will determine the ultimate success of humanitarian delivery. As a

contribution to the debate on supply chain management for humanitarian aid, this section seeks to identify the range of factors which are critical to the successful operation of a humanitarian supply chain.

5.3.3.1 CSFs from the commercial perspective

According to Huotari and Wilson (2001), Rockart (1979) expounded on the idea of CSFs as far as the supply chain is concerned. All which was founded on the existing work on MIT, by acknowledging proper distribution as one of the CSFs where applicable. There are a considerable numbers of researchers who have appreciated the role that CSFs play within supply chains in commercial contexts. As Porter (1985) considered the concept of the value chain with CSFs, Gunasekaran and Ngai (2003) proposed five core elements which are invaluable important to the survival of small-sized companies specializing in logistics. The identified factors being: proper planning, capacity planning, transportation planning, management of the inventory, and the up-to-standard management of information within that particular company. Razzaque and Sheng (1998) examined the concept of CSFs from the perspectives of outsourced logistics, determination of the payback time, significance of the human resources, proper channels for the communication of ideas, relationships, setting company goals, gauging the performance of the company by using those goals as the benchmark, and the focus of customers.

Power et al. (2001) states that CSFs in business supply chains have seven main elements which are: participative management that is more specific than human resource management, the management of information, unremitting progress, the proper handling of the inventory, and good relations with their respective suppliers, the just-in-time methodology, and the integration of technology in their operations. In contrast, Wong (2005) examined the factors of success in relation to the management of knowledge in ventures ranging from the small to the medium sized, and grouped eleven diverse

undertakings into resource management, information management, strategic planning, unrelenting progress, and the management of human resources.

Therefore, from the reviewed literature, one can conclude that there are few success factors that cut across a range of resources and can be implemented for the success of supply chains that lead to operational effectiveness and cost efficiency. In addition, these factors are of immeasurable importance in the quantification of the progress achieved by humanitarian supply chains.

5.3.3.2 Critical success factors for humanitarian supply chain management

There are seven factors that have been deemed important for the management and progress of humanitarian supply chains. These CSFs are:

- strategic planning
- management of the inventory
- time
- transport and capacity planning
- unrelenting progress and collaboration
- management of human resources
- management of information

The first is strategic planning since for supply chains to make their expected progress, they must be formulated in such a way that caters for the long-term decision-making process which is required. Moreover, the most superior management department in an organization should be in charge of this process of strategic planning to make sure the best decisions are made which are in-line with the ultimate goals and objectives of the company. Daft and Marcic (2004) state that, strategic planning should be implemented in such a way that focuses on the entire organization and handles all the concerns which

ensure that the company matches the environment in which it operates. In the absence of appropriate strategic management, it is impossible to accomplish the goals of these humanitarian agencies such as realizing effectual chains of supply. Strategic management aims at pinpointing the assets, strengths, and weaknesses of all the imaginable situations in the company. Long (1997) suggests that, organisations should feel obliged to take up a sustainable and an enduring style which allows the company to be ready for the necessary steps to be taken in the face of an emergency.

The second is the management of inventory, since it has been identified that the commercial management of the inventory is the main function of logistics ruled by the “pull” systems. Although, Whybark (2007) feels obligated to inform his audience that in the inventory used in disaster relief situations, they call for the “push” into strategic storage located right before the implementation of the “pull” systems which are meant to get through to the exact area of need. In contrast, other functions of logistics are dedicated to the management of the inventory involved in planning, coordination, and regulations of the flow of materials within these logistics chains of supply. Moreover, the amount of materials, the timing of the supply chain, and the consolidation of the prospective materials are crucial factors which are subject to supply and demand.

Evidently, time is one of the most significant CSFs in all disaster relief operations, since for the stocks to be of help to the affected target population, they must get to the precise place at the expected time. Tatham and Kovacs (2007) state that, approximately three to five days after a disaster takes place, a nation is obliged to use the resources that it has so that it can provide emergency relief services to its citizens who are affected. To make this initiative successful, a comprehensive network should be put into place to meet the demands which accompany any catastrophe. According to the Fritz Institute (2005) as much the donors are important to ensure relief aid operations are successful, in the same way, the importance of logisticians cannot be ignored since they play a pivotal role in these operations. Therefore, a well-thought suggestion is proposed that for the provision of relief to the victims to be successful, this calls for the implementation of a

collaborative warehouse strategy which integrates many agencies. Moreover, it is of great importance that the present warehouse structure is expanded so that it can handle humanitarian responses effectively in future in case the country faces more crises and disasters.

The fourth crucial factor of success is transport and capacity planning since the way transport is handled in crisis circumstances is dissimilar when compared to the situations of commercial organizations. Kovacs and Spens (2007) argue that, commercial companies have reliable means of transport and proper infrastructures to conduct their endeavours, while in handling emergency relief operations, logisticians encounter an unreliable infrastructure and fleet to deliver the provisions which will have to be obtained from the resources at hand, despite how minimal and limited they are. Long (1997) notes that besides the dire need for transport and distribution services in the face of a disaster, humanitarian logistics is needed to address various concerns like scheduling and maintenance. Gunasekaran and Ngai (2003) propose a broad spectrum of undertakings which are necessary in these operations including the minimisations of cost, contracting, payments, tendering, and brokering among others.

The fifth requirement is unremitting progress and collaboration, since according to Power et al. (2003), it is obvious that if the commercial chains of supply are meant to meet the needs of the market place, they must come up with a strategy and approach which ensures that the needs of their customers are met. According to the Fritz Institute (2005), it is important for humanitarian organisations to borrow from different methods of operation and integrate these into their endeavours. For instance, they can adopt performance determining systems which gauge the efficacy of the chain of supply.

The sixth CSF is the management of human resources which is a pivotal factor in all humanitarian organisations since the efficiency of an organisation to respond to a calamity will be partially determined by its ability to organise its human resources.

Even so, Perry (2003) and Thomas (2003) note that logistics expertise levels in many relief aid organisations is below par and the available logisticians have no autonomy to execute the decisions which they deem right for the operation. Moreover, Thomas and Kopczak (2005), insist that the ability of organisations to manage their staff at the sites where the incidents took place can have an immense impact on their efficiency and capability to deliver aid to the affected population.

The final determinant of success in supply chains for disaster handling is the management of information. As noted by Perry (2007), King (2005), and Maxwell and Watkins (2003), the promptness with which it is utilised has an important effect on the success of an organisation's response to a disaster. Long (1997) argues that IT is a crucial element in humanitarian aid operations since it supports the organisation's activities. The author goes on to state that the way in which information is passed between different departments in a relief aid operation has tremendous effect on the success or failure of the operation. Moreover, information management is the largest determining factor of the success of any relief aid operation (Long & Wood, 2005). This is because IT systems are responsible for providing precise information, gauging performance, and controlling the entire operation (Gunasekaran and Ngai, 2003). Furthermore, Gunasekaran and Ngai (2003), Soin (2004), and UNDP (1993), point out that the flow of information, compatibility of the systems, and strategic management are the key factors which dictate the success of any operation.

5.4 Humanitarian Logistics

Humanitarian logistics and enterprise logistics have a lot of similarities, but compared to the best practices from the enterprise world, humanitarian organizations still lag behind. Humanitarian logistics seeks to deliver services and relief aid to the people who are suffering for any kind of disaster, in order to alleviate human suffering based on the prior condition of the response speed.

A set of characteristics that set business logistics apart from humanitarian logistics can now be identified. Business logistics usually deals with a predetermined set of suppliers, manufacturing sites, and a stable or at least predictable demand – all of which are factors unknown in humanitarian logistics (Cassidy 2003). Humanitarian logistics are again characterized by large-scale activities, irregular demand, and unusual constraints in large-scale emergencies (Beamon and Kotleba 2006). In terms of the end-result that is strived for, business logistics aims at increasing profits whereas humanitarian logistics aims at alleviating the suffering of vulnerable people (Thomas and Kopczak 2005). The supply network structure of humanitarian logistics also differs from that of business logistics because it is comprised of so many actors with no clear or stated linkages between each other. While the operations and actors are intertwined, different groups of actors and different phases of disaster relief operations can be distinguished. All these operations have a common aim to aid people in their survival. They often have to be carried out in an environment with a destabilized infrastructure (Cassidy 2003; Long and Wood 1995), ranging from a lack of electricity to a limited transport infrastructure. Furthermore, most natural disasters are unpredictable, thus the demand for goods in these disasters is also unpredictable (Cassidy 2003; Murray 2005). The immediate response stage of humanitarian aid involves emergency and rapid response measures and usually involves a large amount of supplies being rushed to the disaster location. This is distinct from the commercial supply chain which uses tried and tested routines to move merchandise according to set schedules. Most of these characteristics can actually be associated with different types of emergency situations, and not only those that deal with disaster relief. Nevertheless, what sets this type of emergency situation apart from others is usually the magnitude of the catastrophe taking place and the logistical operations needed to cope with it.

However, the humanitarian support is not always put to effective use. When the effective and good use of systems is discussed, reference is made to the reasons why unnecessarily large operations and costs are incurred or why some victims have succumbed to unnecessary deaths because of shortcomings in the supply chain (Pitt 2010). There is clear evidence that up to recent times, humanitarian logistical efforts

have registered significant failures in their operations, thus calling for the introduction of some of the best practices from their commercial counterparts (Wassenhove and Pedraza 2012). Many studies which have sought to understand the problems of humanitarian supply chain management and provide solutions to the associated problems have failed to capture the full extent and network of the supply chain (Tatham and Houghton 2011). This has seen researchers hurriedly providing remedies that only support fractions of the whole network. In the opinion of this researcher, the humanitarian supply chain is too wide to be comprehended and managed without an independent evaluation and monitoring body (Charles 2010).

5.4.1 Importance of Humanitarian Logistics

In disaster relief work, logistics is the most significant factor and is the key point which makes the difference between a successful and a failed operation and is also the most expensive component in any disaster relief work (Wassenhove 2006). According to Wassenhove, the money spent on logistics has reached as high as 80% of the total for humanitarian relief work. Therefore, enhancing the effectiveness and efficiency of humanitarian relief requires proper investment, in order to utilize the resources during the relief work (Cozzolino et al 2012). Secondly, Scholten et al (2010) claim that humanitarian organizations can increase the number of donors by utilizing their resources, and can also easily gain their trust especially with long-term commitment. Humanitarian organizations need to prove that they are using sufficient, adequate, and different types of funds for the people who are really in need.

Humanitarian logistics is the key to the response phase in many different types of disasters; it involves different operational requirements at different stages of the response phase including immediate, short and long-term needs. All these operations have a common goal which is to aid people in their struggle to survive. However, aid to facilitate the recovery and development of a region means that there are two main

streams of humanitarian logistics that can be distinguished, continuous aid assistance, and disaster relief (Long 1997). Under normal circumstances, long-term disaster relief is left to a later date. The focus points for immediate disaster relief operations are: first aid medical materials, transportation, food, relief equipment, and rescue personnel from the supply points to possibly a large number of geographically dispersed locations in the disaster area, whilst safely evacuating and transferring people affected by the disaster to the nearest health care centres (Barbarosog Lu et al 2002).

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Figure 5.4: The vicious circle of logistics (Wassenhove 2006)

This in turn has led to a ‘fire-fighting’ mentality (Coppla 2006). Managers see logistics struggling and conclude that a review of logistics is not advantageous, further fuelling the lack of understanding, and so the cycle begins again. It is only recently that humanitarian organizations, such as the International Federation of the Red Cross and Red Crescent Societies (IFRC) and the World Food Programme (WFP), have tried to break free of this vicious circle by pinpointing logistics and supply chain management as the keys to a relief operation (Wassenhove 2005). Other organisations in the sector are beginning to follow suit and raise the profile and professionalism of logisticians. In the private sector, over a decade ago, humanitarian organizations began to wake up to the fact that logistics: is crucial to performance (effectiveness and speed) of current and future operations and programmes. And this serves as a bridge between disaster preparedness and response, between procurement and distribution, and between headquarters and the field (Thomas and Mizushima 2005). Logistics also provides a rich

source of data, since it is this department that handles the tracking of goods which could be used to analyse post-event effectiveness (Thomas and Mizushima 2005). And it is the most expensive part of any relief operation and the part that can mean the difference between a successful or failed operation. Whatever the definition should be, a common awareness of logistics, including the planning and preparedness, design, procurement, transportation, inventory, warehousing, distribution and recipient satisfaction, become important. In short, all logistics operations have to be designed in such a way that they get the right goods to the right place and distribute to the right people at the right time.

5.5 Summary

This section has reviewed the basics of supply chains and, on this basis, examined the differences between the humanitarian and commercial supply chains. The CFSs in the commercial supply chain represent seven important points that can increase the effectiveness and efficiency of the humanitarian supply chain.

This chapter reviewed the fundamental knowledge of supply chain management, on that basis, further identified the differences between business supply chain and humanitarians supply chain. In addition, summarized from previous literature and highlight the most importance seven CFS which contributed the operational effectiveness and cost efficiency in humanitarian supply chain

Chapter 6 Research Methodology

6.1 Introduction

This chapter describes the research philosophy and methodology utilized in this research. The structure of this chapter is illustrated in Figure 6.1 through the use of the ‘research onion’. This chapter begins by examining the philosophy of the methodology followed by the research approaches and methods utilized in this research. This study relies on qualitative data, the case study, and comparative approaches. This chapter highlights the approaches that are used in research generally before illustrating and evaluating the specific methods used in the completion of this research.

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Figure 6.1: Research Onion (Saunders et al. 2003)

6.2 Research Philosophy

A research philosophy is a belief about the way data should be collected, analysed and used. The discussion of a research philosophy includes ontology, epistemology, and methodology (Howell 2013), while philosophical assumptions based on research can be divided into positivism and interpretivism (Stanford 2006). Through studying the various philosophical concepts that involve the way a researcher views the world, these assumptions will support the choice of research strategy as part of the methodological strategy (Saunders et al. 2007).

Although, philosophy can be influenced by practical considerations (e.g. time, degree of access to data, etc.), it is more likely to be influenced by the researcher's particular view of the relationship between knowledge and the process by which it is developed (Smith 1998; Saunders *et al*, 2007). This is mainly because not only might there be a different strategy and methodology, but even their perspective is different. For example, a researcher who is more concerned about the disaster response phase is likely to have different views, conclusions and recommendations compared to researchers who pay more attention to the recovery stage. Thus, it is very important for researchers to understand the research ideas and aims to ensure that the correct research method is chosen as this can help enhance the reliability of their research results.

In this chapter, the main focus is on ontology and epistemology since these are two major views of research philosophy, and they are the two important elements of philosophy and its foundations, which this research is built upon. Thus, the research methods chosen are closely connected to and built upon ontological and epistemological assumptions (Grix 2004). Each contains important differences that influence the way in which this author considers the research process.

6.2.1 Ontology

Ontology mainly explores the nature of reality (Saunders 2007). Both Blaike (2014) and Welty (2003) point out that philosophy is the subject of scientific practice which can be traced back to Aristotle. It mainly explores the type of object, its structure, properties, events and processes, and thus illuminates the reality that can be related to all areas (Saunders 2007). Ontology on the other hand is about the things out there or the existence of things. The ideas of ontology mainly centre on why it is important to know what is out there. Although the nature of existence is often about how to learn, it is important to know that it is also related to how it has been researched or studied (Yin 2004). This will make it possible to conceptualize social reality in some terms.

Ontology is related to what people might know and the simple explanation of epistemology is about the truth that is out there but is yet to be discovered (Grix 2004). In general, researchers have some ingrained ontological assumptions that often affect their understanding of what is real, whether the property exists or whether there is any attribute of a group of things in the other (Flower 2009). If these basic assumptions are not considered, some researchers may be blind to some particular aspects of their investigation because they implicitly assume or take something for granted, and therefore are not open to problems, to consider or to discuss (Flower 2009). When considering the different points of view about what is real, researchers must be realistic about how to measure another question and that is the basic definition of the knowledge of reality. This leads to epistemological issues.

6.2.2 Epistemology

“If ontology is about what we may know, then epistemology is about how we come to know what we know” (Grix 2004: 63). Epistemology is what is known to be true, which

can contain a diversity of research philosophy (Jerry 2008). Thomas (2004: 36) defined epistemology as the ‘branch of philosophy that asks questions such as how we can know anything with certainty; or what methods can yield reliable knowledge’. Thomas (2004) quoted the Royce list which contains four methods of achieving this:

- First is ‘rationalism’. This refers to knowing through thinking and reasoning. If a research area is not logical, then that assumes there is nothing that can be true. In this way, knowledge occupies a prominent position in both mathematics and philosophy.
- Second is ‘empiricism’ and largely depends on sensory perception. When the assumption is precise consciousness, then it is the truth. In this case, empirical science therefore plays a key role in the world.
- Third is knowledge by ‘intuition’ which is the basis for direct or obvious consciousness, perhaps from the unconscious process. It is assumed that, if there is consciousness of insight, then the area of research is real. For instance, a large portion of basic art knowledge is intuitively derived from meditation or from personal knowledge.
- Finally, ‘authoritarianism’ plays a significant role. This refers to the method of knowing based on the power or authority. It is true because the authority says that it is true. For example, in some religions, the authority reveals the truth about God or Allah or Buddha.

Thomas (2004) comments that the field is often largely drawn from one or two out of these four (listed above) methods. For instance, a cognitive method is usually adopted as a rationalist philosophy which tries to build the truth through the deployment of parameters and the rebuttal of some aspects. In contrast, physical scientists think carefully and use logic control and record empirical observations and then interpret theory (Richard 2010). This therefore means that every single path to knowledge can be effective but may have limited specific aspects for the world in which it may be suitable.

In terms of this research, the epistemology comes from the reality of the uncertainty of disaster (location, time and scale), where the disaster response has to continuously improve in order to become more effect and efficient. There are three main response participants in disaster relief, the government, military and NGOs. And due to the distinct national background of each country, the emergency plans and participating departments may vary. In spite of this, all the disaster responses need to be implemented in the framework of the emergency plan and this is the first step of a disaster response. In addition, many researchers have argued that 80 per cent of humanitarian aid operations comprise of supply chain management activities (Van Wassenhove 2006; Kovács and Spens 2007; Thomas, 2003; Trunick 2005b; Scholten et al. 2010). And moreover, logistics has always been an important factor in humanitarian aid operations, to the extent that logistics efforts account for 80 percent of disaster relief (Trunick 2005b). The speed of humanitarian aid after a disaster depends “on the ability of logisticians to procure, transport and receive supplies at the site of a humanitarian relief effort” (Thomas, 2003, p. 4). It is from these foundations that this research proceeds.

In epistemology, there are two main orientations found in the social science fields, namely positivism (positivist) and interpretivism (interpretivist) (Saunders et al. 2007). Whereas positivism must imitate the importance of natural science, interpretivism advocates the role of the human social action (Bryman and Bell 2003; Bryman and Bell, 2007; Saunders et al 2007). Although they represent the two main approaches, they are not the only ways to support social studies of epistemology. The following section forms a discussion of the two and how they apply to this current research.

6.2.2.1 Positivism

The roots of positivism can be traced back to Aristotle and was largely used as the main research approach in the twentieth century (Grix 2004). Instrumental contributions towards its development were however achieved through Francis Bacon and Auguste

Comte among other researchers (Thomas 2004; Grix 2004). Apparently, it refers to the method of knowledge gained by limited observable facts and their relationships. Since it rules out unobservable entity references to god and to the senses (Crossan 2003), this epistemological approach is considered wild and comprises a mixture of empiricism, objectivism, and naturalism (Bryman and Bell 2003; Grix 2004; Thomas 2004).

In terms of their distinguishing features, positivists believe that reality is stable and can be observed with interference phenomena being studied and from the objective point of view which it describes (Cohen 2007). Besides that, they argue that even in isolation, the observed values of the phenomena can be repeated. This often involves the manipulation of reality so that only one independent variable changes. This will in turn make it possible to identify the regularity and form of the relationship between some of the constituent elements of the social world.

Positivism has a long and rich historical tradition (Ashley 2005), and has particularly successful associations with the physical and natural sciences. In this respect, positivistic approaches help a researcher to seek identify, measure and evaluate phenomena and to provide rational explanations (Blanch et al. 2006). Therefore applying positivism to this current research entails adhering to the observation that solitary “factual” knowledge gained from the established virtual links as well as relationships among different elements of the humanitarian supply chain management within distinctive NGOs as well as related agencies is trustworthy. This will be instrumental in determining the best way to enhance both the effectiveness and efficiency of humanitarian supply chain management and its operations. Besides that, positivism limits this current research to data collection and its subsequent interpretation through the use of the objective approach. And thus, this make the findings of this research both quantifiable and observable. Therefore, this factual reality is useful for this research.

6.2.2.2 Interpretivism

Interpretivism, as distinct from positivism, seeks to "understand the reality of life and constitute an overall objective by survey and consideration by social actors to build specific meaning to the world" (Outhwaite 2009; Schwandt, 1994: 118). Interpretivism usually has considerable links with other terms such as; idealism, constructivism, phenomenology, and relativism (Grix 2004; Thomas 2006).

The subjectivity of interpretivism concerns understanding, and cannot be explained by mechanical means (Primus 2009). This makes it an appropriate approach for business and management research especially in the areas of organizational behaviours, marketing and human resource management (Crossan, 2003). Besides that, the major concern of interpretivism is the behaviour of the participants. Therefore, when choosing research methods, attempts to describe, translate and interpret research theme events must be used from the perspective of the people who are the subject of the research. This standpoint therefore assumes that people tend to influence events and actions in an unpredictable manner, which interferes with any attempts to identify construction rules or guidelines (Bryman and Bell 2003). However, from an interpretivism research method point of view, human behaviour is not easy to measure as is natural scientific phenomena. Human motivation is not always visible, such as internal thought processes, so that it can become difficult to generalize, for example, the motivation just observed. In addition, people have a habit of interpreting events in dissimilar ways (Bryman and Bell 2003).

Research shows that interpretivists assert that only through subjective interpretation and intervention in reality, can reality be fully understood. The study of phenomena in their natural environment is the key to the interpretivist philosophy, together with the acknowledgement that scientists cannot avoid affecting the phenomena they study (Richard 2010). They easily admit that there may be many interpretations of reality, but

maintain that these interpretations are in themselves a part of the scientific knowledge they are pursuing (Bryman & Bell 2003). In this respect, interpretivism epistemology enables this research to develop the truth by basing it on social interaction, and thus paving way for the inductive approach to be applied. This necessitates the use of qualitative methods for the collection and analysis of data.

The possibility of using a positivist approach was considered in this research, however, as this research aims to gain a better understanding of the disaster response, emergency planning, and humanitarian logistics which means in contrast to the natural scientific type of research topic, the emphasis here lies in achieving an understanding of the social world through an examination of the interpretation of that world by its participants. Moreover, the interpretivist approach allows the researcher to carry out interviews and case studies which are likely to deepen our understanding of the topic. Although this research utilizes interviews, the findings here are not solely based on interactions and communications with people, and in the end, people are not central to this research, but rather are an alternative way to gather data in parallel with case studies and other secondary data to increase the validity of the research (McGregor and Murnane, 2010). Based on the reasons explained above, the interpretivist approach for this research seems to be more appropriate.

6.3 Methodology

There are two main research methods these being the quantitative and qualitative approaches (Morgan and Smircich 1980). Quantitative methods are mostly employed by positivists and always result in numbers as they try to produce causal explanations or even scientific laws. And they do not only refer to the notion of natural science in their ontology and epistemology (Phillimore Goodson 2004). Qualitative methods, on the other hand, are usually employed by relativists. Corresponding to their ontological and epistemological position of a world that is only socially constructed and all knowledge

that we can have about it is subject to interpretation, relativists use interviews, focus groups and other qualitative methods to get an in-depth insight into a field. This provides a richness of description not obtainable by quantitative research. The aim is to find out the meaning of social behaviour (Walliman 2005).

6.3.1 Qualitative and Quantitative Approaches

Qualitative research usually requires a lot of different academic disciplines like those frequently used in the social sciences and educational researches. The aim of qualitative researchers is to gain a better understanding of human behaviours, and why they act as they do. Besides, qualitative research methods investigate the reasons and methods of human decision-making, not only just what decisions people make, but also answers to questions like; why, when, where and how they make decisions (Richard 2010). Thus, qualitative research tends to focus on a smaller but more concentrated sample resulting in tighter information or knowledge about a particular case study (Yin 2006). In the traditional view, qualitative methods produce only particular case study data, where any more general conclusions need different considerations. In addition, qualitative methods can be used to seek empirical support for a postulated hypothesis (Bryman 2001). Among the key cons of this approach are that it has a complete and detailed aim. Key benefits are also derived from the fact that the researcher is the ultimate instrument used in the gathering of data. Flaws on the other hand exist for this approach. First, during the process of research, the researcher gets immersed fully in the research topic. Finally, since qualitative methods cannot be designed before a research study commences, the qualitative approach becomes time consuming (Yin 2006).

In the social sciences, quantitative research refers to the use of statistical, mathematical or computational techniques and other methods to carry out the systematic empirical study of social phenomena (Given and Lisa 2008). The goal of this research is to develop and apply a mathematical model related to the social phenomenon, theory or hypothesis. Apparently, quantitative research is the most important measuring process

since it fundamentally links the phenomena of "empirical observation" and "mathematical representation". In addition, quantitative data includes a variety of information presented either in digital form, such as statistics or percentages. Quantitative research methods generally make use of obtained data, pre-data, and data analysis to give a summary of findings (Miles and Huberman 1994). Two methods that can be used to implement quantitative research methods are descriptive statistics and linear programming methods. The quantitative approach comes with a number of advantages. First, the data used can be relied on to act as a snapshot of a whole population. Secondly, by just increasing the sample size, the p-value can be adjusted to the required one, which ultimately improves the statistical power and thus further boosts accuracy (Yin 2006). Although this approach is instrumental in research, it is known to contain several flaws. Sometimes the quantitative approach fails to provide vital information, and it is also known to be time consuming and has a tendency to make predictions difficult (Bryman 2015).

Quantitative and qualitative research studies typically contrast, for instance in terms of their analysis and observations to discover potential meanings, patterns and relationships, including the type of phenomena and entities classified in such a way as to not involve any mathematical model of explanation (Yin 2006). A scientific investigation normally draws a distinction between qualitative and quantitative aspects, although some researchers argue that the two go hand-in-hand. To exemplify this, Gutting (2004) states that large amounts of qualitative work have usually been the prerequisite to fruitful quantification in the physical sciences.

A qualitative approach is defined by Patton (2001: 39) as "a naturalistic way that seeks to understand phenomena in context-specific settings". Winter (2000) defines the quantitative approach as attempts to fragment and delimit phenomena into measurable or common categories that can be applied to similar or wider or even all subjects and situations.

Comparing the two approaches, it is found that “qualitative data (thus analysis) is normally transient, understood only within context and is associated with an interpretive methodology, while quantitative data (thus analysis) is normally precise and can be captured at various points in time and in different contexts” (Collis and Hussey, 2009: 143). In addition, the qualitative approach pays more attention to illumination, understanding, and extrapolation in similar situations, while the quantitative approach seeks causal determination, predication, and the generalisation of findings (Hoepfl 1997). In the end, qualitative analysis may result in a different type of knowledge than the quantitative inquiry, because “one argues from the underlying philosophical nature, enjoying detailed interviewing and the other focuses on the apparent compatibility of the research methods” (Glesne and Peshkin 1992: 8).

Interpretivism and qualitative approaches are sometimes used interchangeably while positivism and quantitative approaches are often related (Williams, 2000). Although a qualitative approach is adopted, the two approaches are not mutually exclusive and can be combined sometimes quite naturally. Numerical data have been proven to be appropriate, for example in dealing with a growth rate, total output, and production share. Having chosen which approach to take up in this study, the research strategies associated with the qualitative approach are case studies and interviews which are discussed below.

6.3.2 Case Study Approach

A case study can be used to develop both primary and secondary data. According to Yin (2004), the distinctive features of a case study are that it attempts to explore contemporary phenomenon in real-life situations especially when the boundaries between a phenomenon and its context are not obvious. Compared with other methods, a case study is one of the advantages of the ability to conduct in-depth research. In addition, the case study is one of the best applications mainly because it provides a

description or explains how or why it happened (Shavelson 2002). Its main purpose is to produce a first-hand description used in the understanding of people and events. Yin (2004) defines a case study as an empirical inquiry that investigates a contemporary phenomenon within its real-life context especially when the boundaries between a phenomenon and its context are not clearly defined. Yin (2004) further argues that a case study allows an investigation to retain the holistic and meaningful characteristics of real-life events such as individual life cycles, organisational and managerial processes, neighbourhood change, international relations, and the maturation of industries.

The case study provides the opportunity to a researcher to study a particular subject in depth, such as one organisation or a group of people (Yin 2013). It normally contains information/data collection and analysis, which could be both qualitative and quantitative in nature. When giving the case study due consideration, data should also be collected from different sources for its integrity to be ensured. Due to their renowned benefits of simplifying research, case studies have been applauded by critics who have focused on the extent to which the method can generate some useful data, and allow easy availability to several distinct perspectives (Thomas 2004). The value of the form of case studies shows another aspect of triangulation (e.g. using a number of circumstances, if possible). According to Rothbauer (2008), triangulation is an effective way to enhance a case study's effectiveness.

There are two main types of designs for case studies which are single case and multiple cases (Yin 2009) (see Figure 6.2). Multiple cases offer a robust framework for data collection (Remenyi et al, 1998), and are a source of explanatory data to feed subsequent generalisations about the how and why of the network explored. These multiple case studies are included to increase the explanatory power and generalizability of the data collection process (Miles & Huberman 1994). When a multiple case study is used it comes with both benefits and difficulties, which is important to take under consideration by the researcher. The researcher may however, according to Baxter and Jack (2008), keep in mind that it can be an expensive and time-consuming process to

implement a multiple case study. The more case studies a study has, the more likely it is that it is confident in its representativeness, but the less observation time the researcher has had to study each of the cases (Gerring 2004). According to Yin (2003) it is better to implement a single case study when the researcher wants to study for example a person or a group of people. In addition, the researcher can question old theoretical relationships and explore new ones when the single case study is used. As noted by Dyer and Wilkins (1991), this depends on the fact that a more careful study is implemented.

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Figure 6.2: Basic types of designs for case studies (Yin 2009)

6.3.2.1 Comparative approach

In order to facilitate the extraction of data that would most satisfactorily address the research questions in this study, the comparative case study approach is adopted here. Yin (2004) has described the case study methodology as a distinctive means of empirical enquiry particularly suitable for exploring the how and why of contemporary phenomena within a real-life context.

This methodology, notes Yin (2004), is particularly relevant when the researcher believes the context to be highly pertinent to the subject under study, hence the rationale for choosing this approach is that it allows for 'cross-region' (Hakim 2000) comparisons between the disaster response and humanitarian supply chains in China and Taiwan (see also Flick 2006; Mangen 2013). Likewise, case study techniques are recognised as providing a means to examine a multiplicity of perspectives to illustrate a social entity or pattern and to test ideas and processes (Hakim 2000; Ritchie & Lewis 2006). This research methodology, therefore helps to provide an understanding, and to compare the operation of governments and NGOs, practice and policy implementation, processes of change, and comparative studies of the two regions (Kennett 2001).

Techniques applied to case study methods have been described by Yin (2004) as including the use of multiple sources of information, establishing a chain of evidence, pattern matching, explanation building, addressing and explaining variations and applying replication logic when using multiple case studies. Consideration in terms of case study methods is also given to the need for a transparent, robust and unbiased process of data analysis with the accurate presentation of carefully selected and relevant information (Hakim, 2000). The development of theoretical propositions prior to a case study research process is also recognised as beneficial in guiding the logic of the research design, data collection, and analysis techniques (Kennett, 2001; Yin, 2004). In this manner, and as discussed below, in this research a comparison of the disaster responses and humanitarian supply chains from both the governments and NGOs during the Wenchuan Earthquake and Typhoon Morakot in China and Taiwan is undertaken, using a theoretical framework and standards informed by a review of the theoretical and empirical literature.

A possible weakness of the case study methodology has been identified in terms of objectivity and the vulnerability of this method to being shaped by the researcher's own interests and perspectives (Becker and Bryman 2004). To address this concern, it was important that this researcher consciously adopted as much of an objective perspective

as possible throughout the study. In addition, it was necessary to remain aware of the challenges identified by Becker and Bryman (2004), such as for instance, the large quantities of data which might be gathered, especially that drawn from interviews with informants, the manner in which some of it may be contradictory in nature, and the research skills required in overcoming the complexities of accurately analysing, determining and capturing unbiased and representative participant views.

6.3.2.2 Rational for choosing the Wenchuan Earthquake and Typhoon Morakot

In this research, the chosen case studies are China's Wenchuan Earthquake and Typhoon Morakot that occurred in Taiwan. The rational for choosing these particular sites was mainly due to the characteristics of the Wenchuan Earthquake and Typhoon Morakot, the development of their associated disaster management and emergency planning, and the development of the resultant humanitarian relief and involvement of the NGOs in these disasters.

China is not only a country that is still in its developing stages in terms of its disaster management and emergency planning, but also the Chinese government has so far barely officially noticed the efforts of NGOs during responses to disasters. In contrast, the developments of disaster management and emergency planning and humanitarian relief in Taiwan are more developed. In addition, the characteristics of the Wenchuan Earthquake and Typhoon Morakot were very similar. Both were historical natural disasters huge in scale with many casualties, and were complex which made it difficult to carry out relief work in response. Moreover, China and Taiwan have many similarities, such as their culture and history.

Therefore, the benefits of this research are to act as an eye opener to the Chinese and Taiwanese governments and to inform them that the time has come when these

governments should both reinforce and enhance their NGOs' capabilities to carry out more effective disaster responses and humanitarian relief work under a new emergency response plan. However, for achieving the objectives of this research, the scope was limited to only two NGOs selected to act as appropriate case studies. These were the China Red Cross and Tzu Chi which are the most influential NGOs in China and Taiwan respectively and both were the biggest contributors and participants during each disaster.

6.3.3 Data Collection

During the primary data collection stage, interviews constituted one of the main sources of data in this study. The data utilized in any research study can either be primary or secondary but this fully depends on the source of the information. However, this research used a combination of both primary and secondary data. The secondary research was first conducted and then followed up with primary research to fill any gaps in the knowledge. The secondary sources used include scholarly analysis of humanitarian supply chain management in humanitarian relief work, official reports of the Chinese and United Kingdom authorities, international humanitarian organizations, and newspaper and online articles.

6.3.3.1 Primary Data

The main reason for preferring the use of primary data is that researchers gain the opportunity to collect information for the specific purposes of their study and therefore do not have to filter the collected data (Yin 2015). In essence, the questions researchers ask are tailored to elicit the data that will help them with their study. Researchers collect the data themselves, using surveys, interviews and direct observations. In its basic form, primary data constitutes information collected by a researcher directly through such

instruments as surveys, interviews, focus groups, or observations. When this is tailored to the researcher's specific needs, primary research data provides the most accurate, reliable, and up-to-date type of data (Creswell 2013).

- **Semi-structured Interviews**

Semi-structured interviews refer to attempts made to collect information from another person by asking questions (Wengraf 2001). Although the interview follows predetermined questions, the semi-structured interview provides opportunities for participants to state what in their opinion they regard as the most important issues (Bryman 2007). Many researchers prefer the use of the semi-structured interview because the interview questions can be prepared in advance (Shavelson 2002). This therefore allows the interviewers to be prepared and appear competent during the interview (Cohen 2006). Besides that, semi-structured interviews not only allow informants to freely express their views using their preferred terms, but these also provide reliable and comparable qualitative data (Tom 2001).

Semi-structured individual interviews were utilized in this study because they have the capacity to provide a deeper understanding of the reality of how governments and NGOs carry out their disaster response under the instruction of emergency plan. Through a face-to-face conversation the researcher sought to find out how and why the governments and NGOs manage their supply chains, what procedures are involved, the effectiveness and efficiency of their relief measures, and the basic level of humanitarian support for the affected population. Subjective views of respondents were used as the crucial instrument for interpreting empirical data acquired through secondary sources. The protagonists' views on the effectiveness and efficiency of humanitarian logistics under emergency plan and their opinions on the potential ways to improve them, form the critical supplement and materials in this study to understand humanitarian supply

chain management during the disasters response among different NGOs. For more details see the sampling section.

- **Interview Questions**

Semi-structured interviews were organized based on the following seven main points:

1. How do you criticise current emergency plan? How does it affect deliver aid (positive or negative and why)?
2. Frame the structure of the existing humanitarian relief aid and humanitarian supply management in China/Taiwan;
3. During the disasters response, how did the humanitarian supply chain system operate and why?
4. How is humanitarian supply management organized? And what part is played by the differently with instructions provided by emergency plan?
5. How can the humanitarian supplies chain become more effective and efficient? And how important is it to apply this in humanitarian relief work?
6. In what ways do the authorities coordinate their efforts at the local and national levels? And are they really satisfied by the roles played by different authorities?
7. What was the biggest challenge or challenges during the time of the disasters? Why? And how can these challenges be solved?

The interview questions mainly focus on the existing structure of the disaster responses required by the emergency plan, governments, or relevant authorities; how the governments and NGOs respond and carry out their relief work separately and together; and the gaps between the theoretical and practical levels. Although further relevant information was also sought through the use of secondary data.

Despite, the availability of the relevant data and information through secondary data, this is not the most reliable and complete source of information. In addition, these secondary data were collected for other purposes. Therefore conducting the interviews was necessary. By collecting primary data, this allows more accurate, extensive and in-depth data to be obtained with which to identify and address the research objectives.

Notably, the interview questions excluded sensitive questions linked to the respondents' organizational position, their personal views on the effectiveness and efficiency of the Chinese authorities' response to the disaster, and other issues associated with moral hazards. Each respondent was granted the opportunity to refuse to answer any question and instead could choose to remain silent.

- **Sampling**

The interview was one of the main sources of primary data collection in this study, and thus the choice of respondents in this study was critical. This needed to meet the following two requirements. First, the respondents needed to have the relevant knowledge within the scope of research, and secondly, they had to be willing to openly discuss issues with the interviewer.

A number of persons were interviewed to meet the objectives of this research. First, various humanitarian personnel drawn from the two aforementioned NGOs provided useful information that was used in the examination of China's and Taiwan's emergency planning structure. Secondly, respondents were randomly chosen from different government departments as well as the military. These respondents gave crucial information on how they managed the humanitarian supply chain during the disaster response. Finally, respondents were also drawn from various disaster response and recovery teams who disseminate important information used to determine the index

of effectiveness and efficiency. All this information was invaluable towards understanding the various challenges faced by China's and Taiwan's NGOs and therefore provided a basis from which to make appropriate recommendations. There were two basic yet important requirements for choosing the respondents in this current study.

The total population of my potential interviewees are very small, there are less than 20 people who qualified for this research in China. The sampling population in NGOs are bigger than government section, but due to the China Red Cross fraud scandal it was hard to get contact with my potential interviewee. The Ministry of Civil Affairs Bureau of China was the first to be contacted, and they recommended a possible study participant and provided their contact details. In addition, the China Red Cross and the Ministry of Commerce of the People's Republic of China, were also contacted in order to identify any further potential interviewees. Same situation happened in Taiwan as well.

Table 6.1: Number of interviewees

Location	China	Taiwan	Total
Government	3	5	8
NGOs	2	1	3
Military	1	0	1
Total	6	6	12

A total of 12 interviewees were interviewed (see Table 6.1) whose backgrounds were drawn from either central/local government and who had previously been involved in the humanitarian relief aid and humanitarian supply chain management during either the Wenchuan Earthquake or Typhoon Morakot, or who were NGO workers or officers who had previously been involved in the humanitarian relief aid and humanitarian

supply chain management. Due to the aim and objectives of this research, all the participants were required to have the relevant background and be managers at the local level.

In China a total of 6 people were interviewed. The first 2 people were interviewed from China Red Cross which ranks as the largest NGO in China; 3 were from the government; and 1 person from the military. The reason of interviewing them was that the government was the leading department during the response and recovery stage. The military only played a supporting role. And although no single regulation calls for NGO involvement, during the Wenchuan Earthquake, NGOs made great contributions to the humanitarian support and relief operations. This shows that the government, military and NGOs are the leading response and recovery parties in China during disasters.

On the other hand, in Taiwan, efforts to interview respondents from Red Cross were unsuccessful and as a result, Tzu Chi - the biggest NGO in Taiwan - stood out as a better alternative. They too were involved in international relief aid, and made significant contributions during Typhoon Morakot. Additionally 2 persons from the Taiwanese government department were also interviewed. The case study in this research involved only 12 interviewees mainly because the selected departments constitute the main force during disaster response and recovery. Moreover, 3 people were interviewed from the Civil Affairs Bureau which plays an instrumental role in the managing and distribution of relief goods. The case studies did not focus on the central or senior decision-making level but limited its focus to the actual operators in the field. In this respect, all the interviewees were drawn from either the same level or were responsible for the same things. For instance, whereas the government interviewees were being drawn from the Civil Affairs Bureau which specializes in emergency supplies management and distribution, the NGO interviewees were drawn from those involved in the field of disaster relief.

On the other hand, the most important reason why military interviewees were selected for China is that the military is the only government body that is involved in the provision of manpower during disaster relief, especially during the rescue phase. This means that China's army is the main source of China's disaster relief and can therefore not be ignored. However, in Taiwan, the army only plays a supporting role. The interviewing for the purpose of meeting the objectives of this research was realized through face-to-face conversations the time of which were determined through a phone call. A total of six core people were interviewed, three people from the government sector mainly responsible for relief materials management, two people from NGOs, and one from the military.

- **Time and Location**

Using an appropriate schedule agreed to by the respondents, the researcher conducted interviews in both China and Taiwan. In China, the researcher conducted face-to-face interviews in different cafes or teahouses chosen by participants and telephone interviews. One full interview took approximately 1 to 2 hours. The interviewing process in China was conducted in July 2014. However, in Taiwan it was more difficult to conduct interviews due to the culture of a formal meeting having to be face-to-face. After obtaining informal consent from the study participants, they were provided with the formal consent form that contained a basic description of the research topic and its purpose, ethical and confidentiality provisions to assure them that their opinions and views were not to be used for purposes other than this research. Moreover, the respondents had every right to freely terminate their participation in the interview process at any stage without explanation.

6.3.3.2 Secondary Data

Secondary data refers to data that already exists since it has already been collected (Saunders et al 2007). The advantages as pointed out by Weathington (2010) of relying on secondary data are its ability to save the researcher a lot of financial resources as well as time. In other words, using secondary data will always cost the researcher much less than collecting primary data. In addition, secondary data usually provides permanent and readily available data sources that can be checked relatively easily by others in the form of data and research results, which means there is more openness to public scrutiny (Brains 2011).

Figure 6.3 below that adopted from Saunders et al (2007), there are three different types of secondary data. The first category is made up of documentaries which are made up of either written materials and comprise of books, journals, magazines, newspapers, websites or non-written materials which include television, radio, pictures, drawings, films, DVDs and CD-ROMs. The second type consists of multiple sources which comprise of industry statistics and reports, as well as government publications. The final type is surveys and is generally made up of government surveys, organisation surveys, and academic surveys. To effectively make use of secondary data sources in fulfilling the objectives of this research, all the three types were utilized. The researcher made use of published journals found freely on online databases, reliable websites, accredited news sources as well as books written by renowned authors about humanitarian supply chain management. Moreover, the references from articles and books also contained sources of data, so the researcher could track these down to the original source. In addition, secondary data were collected from industry statistics and reports as well as government publications related to the objectives of this research.

Figure 6.3: Types of secondary data (Saunders et al. 2007)

In terms of collecting secondary data, there are a number of methods. For example, the author has read books (e.g. How to write an emergency plan; Introduction of Disaster Management; Humanitarian supply chain) and journal articles (e.g. Journal of Disaster Management; International Journal of Logistics, International Journal of Emergency Management, etc.) on the chosen topics mainly through the Coventry University library and its on-line database (e-library). In addition, books and articles (including those from the e-library) often contain full references to the sources of data which makes it relatively easy to track down the original source. Moreover, there are also quality newspapers and official reports (mainly published by the United Nations) which allows the author to remain up to date with recent events.

6.3.4 Reliability and Validity

It is very important that an assessment of the validity and reliability of the methods used in this research is conducted. According to Thomas (2006), validity and reliability are frequently presented together in social research. Cozby (2009) states that reliability refers to the constancy of results achieved in research. In order to meet this criterion, another researcher should be able to replicate the original research using the same subjects and research design under the same conditions (Collis and Hussey 2009).

On the other hand, both validity and reliability are crucial in ensuring the research conducted is effective in achieving its goals. The utilization of the interview, documentary survey (including literature and grey literature) to validate the outcomes of this research are instrumental in this study. By using a sufficient number of both primary and secondary sources of data, validity of this research can be attained. Among the accepted definition of reliability is the consistency that a research instrument achieves in its role (Bryman 2001). In order to ensure the reliability is increased to acceptable levels, the use of random sampling in the selection of interviewees was put to practice. Secondly, the fact that only one person conducting the interviews is a good enough reason to ensure the reliability of the collected data (Arksey and Knight 1999).

6.3.5 Research Ethics

Ethics are the norms or standards of behaviour that guide the moral choices about our behaviour and our relationships with others. The goal of research ethics is to ensure that no one is harmed or suffers adverse consequences from any research activities, including both the researcher and the research participants. Therefore, the researcher needs to receive ethical approval before collecting any data (Gregory 2003). This research conforms to the Coventry University research ethics guidelines, which consider five main principles present in Figure 6.4 in below.

The 'Research Ethics Pentagon' or '5 Rs'

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Figure 6.4: Research Ethics Pentagon (Beech 2014)

With reference to the principle of the rights of the participants, the interview questions excluded sensitive questions. The Participants received 'Interview protocol' (Appendix 3) 'Participant Inform Sheet' (see Appendix 4) and 'Consent Form' (see Appendix 5) before the interviews started.

With reference to routes, the researcher received ethical approval before collecting any data. In the case of respect, the interview participants assented that their views and opinions were elicited in an appropriate and non-biased context without changing their original meaning. They agreed therefore that their interview responses could be used in the current research process. With regard to risk and confidentiality, no real names appear in this research, and the research data was personally sealed with the feedback separated from other information. Finally, with regard to record keeping, permission was granted to conduct and record interviews before getting started. Primary data security was guaranteed through the use of password protected computers. Each file containing an interviewee's feedback data was protected by a unique password known

only to the researcher. Upon completion, all the data were destroyed on or before the 1st of August, 2017.

6.3.6 Limitations

The study is naturally limited as obtaining empirical data associated with natural disasters and humanitarian relief meets a number of challenges. Moreover, data linked to humanitarian relief management and logistics is often sensitive in terms of national security as military personnel and security forces are widely used in the course of humanitarian relief operations (Christopher 2000). Therefore, it was very difficult to identify any volunteer participants to participate in this study.

The challenges of conducting the interviews were varied. In China, at least 20 emails were sent to potential participants but no one replied. In the end, my supervisor helped me to connect with the China Red Cross and a few government staff members. These participants were contacted in the early part of November 2013, and interviewed at the end of March and April 2014. The situation in Taiwan was more difficult. The biggest issue was the consideration of the acceptability to undertake an interview. In this case it took at least 2 months for the researcher to start interviewing. Due to cultural conflicts, the participants in Taiwan preferred face-to-face interviews and to meet in person to have a little chat first, all of which prolonged the research process.

Moreover, the primary data collection and analysis procedures were limited by the subjective perspectives of the respondents and interpretation difficulties. Seeing emergency logistical management through the prism of the main managers is often instrumental in understanding the response, but this may impair the objective perspective towards the disaster. In this study, this potential discrepancy was overcome through the efficient utilization of the theoretical research framework organized around

robust methods and approaches for the analysis of secondary data. In summary, these research methods have all contributed to a better understanding of the theoretical and practical aspects of emergency logistical management in highly complex emergency situations.

Nevertheless, the transparency of government information access was very different in China and Taiwan. This means that different aspects of this research obtained different levels of information. This in turn may have caused reduced accuracy in the comparisons if the data were based on different levels of information for the policies of different countries.

6.4 Summary

The research adopted examined positivism and interpretivism in research philosophy and conducted qualitative approaches with semi-structured interviews and case studies with comparative approach. In addition, explained the strengths and limitations of both in reliability and validity.

Chapter 7 China case study - Wenchuan Earthquake

7.1 Introduction

China is prone to many natural hazards such as earthquakes, typhoons, floods, and droughts (Chinese Ministry of Civil Affairs 2008). Such disasters have created a significant challenge and factors that have impacted on economic and social development (Helbing and Kühnert, 2006). In addition, natural disasters have posed a significant threat to China's national security and social stability. Amongst these natural disasters, the one regularly occurring in China and which has had a great impact over recent years has been earthquakes (Chang 2000).

One recent and devastating example was the Wenchuan earthquake that struck the Southwest Sichuan province of China on May 12th, 2008. This earthquake led to the destruction of buildings, schools, infrastructure, etc. The number of people who died was 69,227, with 374,643 injured, and 17,923 missing (Chinese Ministry of Civil Affairs 2008). Amongst the dead were 5,300 children; most whom were students. In addition, economic losses were huge, at approximately 3% of China's 2008 GDP, the value was 845.14 billion Yuan equal to £97 billion British Pounds. Most of these economic losses due to buildings, of which 27.4% was residential, 21.9%, infrastructure, and 20.4% non-residential space (Chinese Ministry of Civil Affairs 2008). Furthermore, with approximately 15 million people living in the affected area, the disaster left approximately 4.5 million people homeless (Hooker 2008), although this number may have reached 10 million (Malcolm 2009). These all made it the deadliest earthquake to hit China since the People's Republic of China was founded.

A disaster of such a magnitude affecting such a large-scale area calls for the government and other agencies to be adequately prepared in terms of emergency response in order, to help protect and possibly save the lives of millions of people. Effective emergency response preparedness should including forecasting emergencies and planning for such emergencies way in advance (Maxwell, Daniel and Watkins 2003). Disaster Preparedness ensures that a response will be faster, more efficient, and will achieve the objective of saving lives. In light of the above, the primary objectives of this chapter are as follows:

- Use the Wenchuan earthquake in China as a case study to examine the effectiveness of the emergency humanitarian response by the Chinese Government and NGOs during the Wenchuan Earthquake.
- Investigate the challenges encountered by the Chinese government and NGOs in executing the disaster response and provide recommendations in response to these findings.

7.1.1 Brief Background of Wenchuan Earthquake

The epicentre of the earthquake was in Wenchuan County, 92 km northwest of Sichuan (Di et al 2010). The map below (Figure 7.1) shows the epicentre and how the earthquake spread to the neighbouring provinces. It can be seen that the earthquake covered a large-scale area and location that felt the impact were in the areas from Chengdu to Shanghai, and from Beijing to Guangzhou.

Figure 7.1: The epicentre of the Wenchuan Earthquake and the affected neighbouring areas (Maps-of-China 2008)

The earthquake spread and covered a large-scale area including 44 counties. There were secondary hazards that occurred as a result of the primary effects (Benedikter et al. 2013). For example, the earthquake resulted in lakes being blocked leading to a threat to millions of people due to flooding, moreover, aftershocks and the risks of landslides were also very high (Chinese Ministry of Civil Affairs 2008). There were 33,000 aftershocks in the central area up to 21st October. Over 600 of this aftershocks measured 4.0 and above on the Richter scale, 60 aftershocks measured up to 5.0, and 7 that measured 6.0 to 6.9. The Figure 7.2 below shows the areas that experienced aftershocks.

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Figure 7.2: Map Showing areas that Experienced Main Aftershocks after Wenchuan Earthquake (Chinese Ministry of Civil Affairs Report 2008)

The earthquake posed a tremendous challenge to the government as some of the major infrastructure was damaged, including the railway, roads, and communication (Benedikter et al., 2013). These posed a great challenge to humanitarian relief distribution, as accessing the affected areas became almost impossible.

7.2 National Emergency Plan in China

7.2.1 Classification of Emergency Response in China

The main objectives of emergency response in China are to aid in decision-making, and offer guidance and protection to the rescue operators (Chinese National Emergency Plan 2012). The Chinese government recognised the importance of disaster reduction by preparing an efficient emergency response (China National Emergency Plan 2012).

The emergency response system in China covers the disaster reduction phases described below (National Emergency Plan 2012):

Natural disaster readiness involving risk evaluation, institutional and practical arrangements for emergency response, mitigation, observation, and early warning;

- Field responses for the aid team, mitigation and rescue actions, with the participation of the whole of society, civilians, and military;
- Disaster recovery and rebuilding outlined in advance action plans, prior, during, and after a disaster, taking into consideration all the factors that influence the process.

The government has exerted unified control by identifying different headquarters that are responsible for various constituents of the relief work depending on the level of and classifications of the earthquake. These headquarters are the State Council, the provincial relief headquarters, the city relief headquarters, and the county disaster relief headquarters (Chinese National Emergency Plan 2012). Different leading departments/headquarters are assigned to coordinate the command and control systems to respond to the disasters.

Four levels of emergencies are classified according to their death toll and economic impact (Xu et al. 2009). For example, for the significant, major, large, and general levels and the emergency response is categorized as grade I, II, III, and IV. The table below (Table 13) summarises the classifications and the emergency response according to China National Emergency Plan.

Table 7.1: Classifications and Levels as per the China National Emergency Plan (Chinese Emergency Plan 2012)

Factors	Level 1	Level 2	Level 3	Level 4
Classifications	Significant Earthquake	Major Earthquake	Large Earthquake	General Earthquake
Impacts	Causes >300 deaths including the missing Economic Losses >1% of China's GDP	Causes <300 deaths including the missing Economic Losses are severe	Causes >10 deaths but less than 50 including the missing Economic Losses are severe	Causes 10 deaths including the missing Economic losses are great.
Leading department	State Council	Provincial Headquarters	City Disaster Relief Headquarters	County Disaster Relief Headquarters

Coordinating department	Relief aid carried out by the Provincial Disaster Relief Headquarters, the State Council also responsible for unified support and coordination	Relief aid carried out by the Provincial Disaster Relief Headquarters, the State Council also responsible for unified support and coordination	Relief aid carried out by the City Disaster Relief Headquarters, in support of provincial Headquarters of Disaster Relief. China Earthquake Administration and other State departments aid in the relief work	Relief aid carried out by the County Disaster Relief Headquarters, in support of Provincial Headquarters and City Disaster Relief Headquarters. China earthquake administration and other State departments aid in the relief work
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Figure 7.3: Disaster and emergency identification and reporting process (Chinese Emergency Plan 2012)

After the classification of emergencies, this is followed by the disaster and emergency identification and reporting process, illustrated in Figure 7.3 above. In addition, Figure 7.4 below shows how during the Wenchuan earthquake, the Chinese government triggered level 2 responses initially but upgraded these to level 1 due to its scale and

economic losses (CCTV 2008). The Chinese National Seismological Bureau reported that the Wenchuan Earthquake was Richter 7.8, which the Sichuan Provincial Seismological Bureau subsequently revised to 8, reporting at the national level, based on instant information collected by the first rescue team (Peng 2007).

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Figure 7.4: Initial response actions about disaster classification and reporting (CCTV 2008)

7.2.2 Roles and Responsibilities of a Leading Department

The response to Wenchuan earthquake by the Chinese government was based on a system linking central and local government departments, the State Council, and provincial relief headquarters.

7.2.2.1 National Earthquake Relief Headquarters for Level 1 Responses

Led by the State Council, the responsibilities of the National Earthquake relief headquarters include taking the lead, coordination, and providing direction during level 1 earthquake emergencies (Chinese Ministry of Civil Affairs 2008). The Vice Premier Wen Jiabao was the director of the Chinese Earthquake Administration, the Secretary of the State Council, and leader of National Reform Commission and Ministry of Civil

Affairs (Chinese Ministry of Civil Affairs 2008). Members are from different government ministries, armed police, committees, and bureaus. Its principal mandate is to ensure there is proper cooperation and coordination for a government response to natural disasters.

7.2.2.2 Local Earthquake Relief Headquarters for a Level 2-4 Response

The local earthquake relief headquarters is based in the local government and is responsible for the unified leadership, direction and coordination of the relief work at the local level of administrative areas (Ministry of Civil Affairs Report 2008). It works in close coordination with the national earthquake relief headquarters, and its main role is to coordinate relief work at the local level by mobilizing the government and community rescue efforts.

In fact, the local headquarters carries more responsibilities with 3 levels than the national headquarters which just has one. This indicates that the local level is more partition orientated while the national is more control, command, and coordination orientated.

7.3 Chinese Government Emergency Response during the Wenchuan Earthquake

The timeline of the Chinese government response activities in the first few days of the Wenchuan earthquake are a key focus of this thesis and are described in Appendix 6. It is important to consider how the Chinese government conducts its emergency response during a key disaster such as the Wenchuan Earthquake.

7.3.1 Central Government response to the Wenchuan Earthquake

Wenchuan earthquake was classified as a significant earthquake (Wu, Li and Xie 2012) and hence the State Council was responsible for leading, coordinating and implementing collective actions for the emergency response. The head of the State Council is the Vice Premier, and the Vice Heads are the Director General of the Chinese Earthquake Administration, and other members are the leaders from different government departments (Chinese National Emergency Plan 2012).

When the Wenchuan earthquake struck, Sichuan Province reported this information to the State Council and implemented the disaster response. A few hours later, the National Seismological Bureau revised the level of response and the State Council immediately established a command headquarters for response and relief. The Vice Premier headed the Headquarters. Later, the Premier flew to the affected area with top officials from the relevant government departments. In addition, the Premier and government officials flew to Dujiangyan one of the most affected areas to guide and coordinate the emergency response operations. Under the joint guidance of the headquarters, different government departments of the State Council attended to their own duties as part of the disaster relief (Peng 2008). The State Council worked closely with the local governments in disaster-affected counties, such as Sichuan Province, Dujiangyan City, and Beichuan County (Liu 2008). The presence of the senior officials indicated the scale of the government attention and the coordination in the relief and recovery (CCTV 2008). The immediate establishment of the relevant protocols to respond to the Wenchuan earthquake disaster relief demonstrated the commitment of the State Council in responding to national disasters (Xinhua News 2008). However, despite the dedicated efforts of the ministries and agencies under the coordination of the State Council, the effectiveness was considerably lower than expectations (Xinhua News 2008).

The efficiency of the work by the State Council in coordination with the local government was not up to standard resulting in administrative delays. There was a lack of coordination between the State Council and ministries and agencies due to a lack of preparedness, practice, and pre-event risk reduction activities (Chung 2013), and these amplified problems that became much bigger than they might have been. The scale of the disaster was huge, putting severe pressure on the emergency headquarters at the national and local levels.

The Central Government responded by performing the following specific functions as described by a report prepared by the Chinese Ministry of Civil Affairs (2008 and 2009):

Chinese Central government responses to the Wenchuan earthquake (General Office of the State Council 2008):

- ❖ Supreme command system was established: An earthquake disaster relief groups was established;
- ❖ Army mobilization and rescue forces: A rescue force consisting of the army and fire-fighters was mobilized by the armed forces;
- ❖ Emergency Fund: RMB 27.482 billion for disaster relief was allocated
- ❖ Internal appeal for disaster relief: This was conducted through government administrative channels;
- ❖ International emergency rescue aid was requested: Four emergency rescue teams came from neighbouring countries and undertook emergency rescue activities; In fact, Chinese government rejected all international aid at the beginning but accepted some donations from a few countries after 2 days;
- ❖ Building temporary shelters: To help in providing shelter to the millions of people who had become homeless;
- ❖ Provision of a three-month temporary living subsidy: The subsidy was given to the affected people;

- ❖ Regulations in dealing with the dead: a timely regulation on dead body disposal was implemented;
- ❖ Mobilizing hospitals: 375 hospitals were mobilized for the injured;
- ❖ Post-disaster reconstruction efforts: a disaster recovery and reconstruction plan was established for the post-Wenchuan earthquake period;

7.3.1.1 Evaluation of the Central Government response

The central government organized a strong management network for the delivery of rapid disaster response and relief (Luis et al. 2012). Immediately after the Wenchuan earthquake, the Chinese central government began high-level response actions as stipulated by the Emergency response plan for earthquake disasters. Within the first few hours of the response, the central government, under the leadership of the Premier established nine working groups (Xinhua News 2008; Xinhuanet 2008; Sina 2008; News163; GOV 2008; CCTV 2009). These were: the Rescue Group; Living People Group; Seismic Monitoring Group; Epidemic Prevention Group; Advocacy Group; Production Recovery Group; Infrastructure Protection and Reconstruction Group; Water Conservancy Group; and Social Security Group.

The initial government response activities were followed by the National Emergency Response Plan, with these national level activities achieving more than expected, such as establishing the Production Recovery Group and the Infrastructure Protection and Reconstruction Group during the response stage. These indicated that the response stage had overlapped with the recovery stage and was well managed.

The working groups were useful as these conducted rescue operations through the key roles played by the Chinese armed forces, the police, and the rescue teams (General Office of the State Council 2008). The Central government deployed more than 113,000

soldiers, 15 medical treatment centres, while epidemic psychological intervention teams were deployed from the rescue groups (Chinese Ministry of Civil Affairs 2008). More than 78,000 tons of rescue and humanitarian materials were shipped and immediately supplied to the earthquake victims (General Office of the State Council 2008). The coordination efforts of the national emergency relief headquarters through the central government pulled 21,560 people from the debris, some of whom were still alive (China Ministry of Civil Affairs 2008). The medical centres treated more than 34,051 injured persons and managed to relocate 205,370 residents, with 557 kilometres of roads being restored over a very short period (Ministry of Civil Affairs 2008). The above achievements by the Central government demonstrate the implementation of the strong administrative network during the disaster management. This management was dedicated to delivering flawless and effective response and relief.

However, despite the achievements by the central government, some issues led the response to fall below standards (Shieh and Deng 2011). Firstly, the lack of sufficient professional rescue teams led to a failure in offering adequate medical and psychological support to the victims (Shieh and Deng 2011), and the Central government demonstrated a lack of disaster preparedness and practice (Interviewee No.8).

“There were not enough professional rescuers offering humanitarian aid to the thousands of injured victims, and the lack of professional teams led to an increased number of deaths. These contributed to the injured victims having to help themselves.”

(Interviewee No.8 2014)

Secondly, there were insufficient stockpiles of materials for disaster humanitarian aid kept by the Central Government (Shieh and Deng 2011). The national and local warehouses were not able to meet the demands of the disaster due to the vast number of

people affected. Also, the locations of the warehouses were not appropriate to ensure the timely distribution of humanitarian materials.

“The mountainous areas where the earthquake had struck lacked a road network and the government had constructed warehouses for emergency relief supplies nowhere near....”

(Interviewee No. 7 2014)

Thirdly, the national government was reluctant to accept assistance from the international community including UN agencies.

“The Chinese government was reluctant to invite the international community in good time.”

(Interviewee No.8 2014)

This contributed to reduced participation by the international community which had a major impact on the disaster humanitarian response and relief. If the Chinese government could have invited the international community more promptly, more people could have been saved.

7.3.2 Local government response

Under the leadership and coordination of the Central Government, the local government of the three provinces (Sichuan, Gansu and Shaanxi) responded faster and effectively (Yong and Booth 2011).

The responses of Sichuan Provincial government included undertaking the following tasks (Chinese Ministry of Civil Affairs 2008):

- ❖ **Establish an earthquake headquarters:** A centre was established at the local level that could coordinate with the national emergency centre.
- ❖ **Mobilisation of the rescue team:** Mobilised armed forces through coordination at the national Level, where local people and medical teams undertook immediate rescue efforts.
- ❖ **Mobilizing emergency relief supplies:** Mobilizing and delivering emergency relief supplies to the affected areas
- ❖ **Repairing damaged infrastructure:** Such as roads, bridges, telecommunications and electricity power lines
- ❖ **Evacuations and relocation of affected people:** survivors and the affected people were evacuated to safe places
- ❖ **Security Patrols:** security was strengthened through patrols
- ❖ **Provision of subsidies to farmers:** To encourage them to build their own temporary houses

There were two headquarters during the Wenchuan Earthquake, these are considered in more detail in Section 7.3.3.

7.3.2.1 Evaluation of the Local Government Response

As reported by Interviewee No. 10:

“The local government of Sichuan province managed to provide farmers with temporary shelters. They provided the farmers with a subsidy amounting to 2,000 RMB per household to build temporary shelters.”

(Interviewee No.10 2014)

The local government of Sichuan managed to organize the central government officials, NGOs, the military, and local people in undertaking the immediate rescue efforts. These emergency delivered humanitarian supplies and managed to build temporary shelters for the affected people (Interviewee No. 10). The local government was also useful in repairing the damaged infrastructure, for example roads, bridges, electricity and telecommunications at the county level. Another role executed by the local government was to conduct monitoring and provided the central government with relevant information about secondary hazards such as aftershocks and landslides. These enabled the central government to have up to date information on events at the county and provincial levels.

As mentioned earlier, the local government were responsible for three levels of response indicating that the local level was the mean partition level during the response. The local government carried out their relief following the response plan, and by providing national level support to the local level to coordinate with relevant departments, such as the armed forces. However, during the Wenchuan Earthquake, the national level played the role of control and command, and coordination (National Emergency Plan 2012). The local level reported all the ongoing activities to the national level, and if there needed to be any changes then the local level will follow national level instructions (People 2008).

The local government also strengthened security by ensuring that patrols at the local level were effectively coordinated. These enabled the affected people in the outdoor places to stay together while guaranteeing an orderly and smooth flow of relief services (Interviewee No.9):

“The security was heightened as more security personnel patrolled the affected areas. Even during the night when they would guard the camps and monitor the progress of the rescue operations.”

(Interviewee No.9 2014)

Despite the tremendous achievements, there were a number of issues that led to an inefficient response by the local government.

There were inevitable delays in the deployment of the rescue teams to the affected areas. This was caused by the damaged roads and infrastructures which resulted in access to the affected areas being almost impossible (Chinese Ministry of Civil Affairs 2008). For this reason, the response within the first 72 ‘golden hours’ was inefficient (China Translation Corporation 2008).

Apart from the damage to the roads by the earthquake, the local government had not invested well in the road networks covering the mountainous areas making the rescue efforts extremely hard. As described by Interviewee No.8 *“There were no road networks in the mountainous areas of Sichuan Province...”*

7.3.3 Evaluation of national and local level Earthquake Relief Headquarters during the Wenchuan earthquake

According to the emergency plan, a lead headquarters should be established after a disaster takes place. What is notable is that during the Wenchuan earthquake, due to the scale of the disaster, it was necessary to set up two headquarters, and so the National government revised the plan and activated two headquarters.

The government in response to Wenchuan earthquake established two relief headquarters at the national and local levels (Sina 2008). The rationale for having two command levels was to ensure collaborative humanitarian efforts between the local and national governments, NGOs, and other private sectors (CPCNEWS 2008). The national emergency relief headquarters took the lead in terms of emergency coordination, and relief; while the local government organized response and rescue teams, and reported to the national headquarters. The dedicated rescue teams from the national and local agencies played vital roles in responding to the earthquake.

The two levels of earthquake relief headquarters had a number of achievements (China Ministry of Civil Affairs 2008):

Firstly, the two levels of relief headquarters managed to form an efficient command system that managed to mobilize resources and rescue teams both at the national and at the local government levels (China Ministry of Civil Affairs 2008). The rescue team mobilized by the emergency centre included militia, local people, and medical teams. And the rescue team conducted delivery of the emergency supplies to the affected areas immediately.

Secondly, the emergency relief headquarters achieved the mobilization of the donations of funds and relief supplies from the international community and internal well-wishers (China Ministry of Civil Affairs 2008). These mobilized resources were then channelled to the affected areas.

Thirdly, the two emergency headquarters collected and assembled information on the rescue operations. Such information was then disseminated to the media. The general public was up to date with what was happening and responded by giving donations and making contributions to the disaster relief efforts.

Fourthly, the two levels of emergency headquarters managed to coordinate the rescue operations, evacuations, and relocation of affected people. In addition, camps and temporary shelters were built for the thousands who were homeless.

Fifthly, the emergency headquarters achieved success in appealing for international emergency rescue aid. The international community and international NGOs intervened and assisted China by contributing to the humanitarian response (Chinese Ministry of Civil Affairs, 2008)

However, despite the dedicated efforts by the two levels of emergency centres there were issues that meant that the response was delayed. The main objective of these centres was to act as command centres to provide a faster and efficient disaster humanitarian response. However, despite their best-dedicated efforts, the working productivity of the government officials involved, the rescue teams, and agencies was undoubtedly less than expected due to the lack of preparedness and practice.

The earthquake affected many people as it had covered a large-scale area of 44 counties (China Ministry of Civil Affairs 2008). The two centres were overwhelmed by the situation and it would have been wise if the Government had established more emergency centres to handle the humanitarian response needed.

The rescue officials were overwhelmed by the divergent humanitarian needs as victims from different counties needed different resources. The rescue team delivered supplies disregarding the specific needs of the various areas. These actions clearly demonstrated a lack of preparedness and practice by the rescue officials.

7.3.4 Government Humanitarian Supply Chain during the Wenchuan Earthquake

The location of the Epicentre led to great challenges in implementing the humanitarian emergency supply and logistics in the collection, transportation, and distribution from the warehouse and emergency centre (Zhang et al n.d.). Figure 7.5 below illustrates the basic five elements of the humanitarian supply chain.

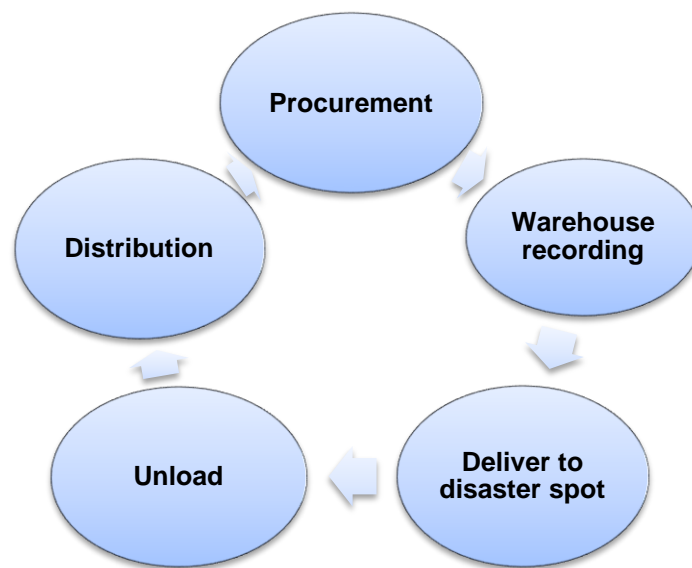


Figure 7.5: Basic humanitarian supply chain

Theoretically, in the response to the Wenchuan Earthquake, evidence has shown that the Chinese Government failed in the humanitarian supply (Moor 2013). Although the military helped to dispatch relief goods, the needs of the affected population were not considered.

“The government adopted a humanitarian supply approach that was not on a need basis; rather it was based on the imaginations of the rescue staff. Supplies of clothing were not implemented adequately.”

(Interviewee No.9 2014)

Secondly, the capacity of the warehouses was questionable. As the size of the affected population was so huge, the stockpiles in the warehouses very quickly ran out. This illustrated that the formula for how much stock should be stored needed to be recalculated during an emergency planning period. In any case, the Chinese government found it necessary to invite donations both nationally and internationally to help with the relief supplies. In total, the international community gave approximately RMB 4.05 billion and RMB0.93 billion in cash and relief materials respectively (Chinese Ministry of Civil Affairs 2008).

This investigation demonstrates that the government failed almost totally in terms of humanitarian supply. First, the Chinese military played a vital role in the delivery of humanitarian supplies through airdropping. More than 100 military helicopters ferried humanitarian materials (Chinese Ministry of Civil Affairs 2008). The source of the materials was initially acquired from the emergency stockpiles held in the emergency warehouses. Humanitarian supplies were not based on a need basis.

The lack records regarding donations meant that these either became redundant or too few relief goods became available. In particular, medical resources and clothing were inadequate in many areas. According to information from the interviews (interviewee No. 9 below), the government gave an open call for assistance with humanitarian supplies. However, the government failed to specify which items were needed leading to the duplication of donations. Certain supplies such as medical equipment and clothing were inadequately provided.

“The Chinese Government launched an appeal both internally and internationally for humanitarian donations. The Government failed to specify the supplies needed and thus people generously contributed based on their imagination. Most of the supplies donated were food and water, but the needs for medical equipment and clothing were not adequately met.”

(Interviewee No.9 2014)

Finally, the government engaged in the urgent procurement of supplies to meet the needs of the affected people. However, the Government procurement team was pressured by the divergent humanitarian needs as the earthquake had affected many people over a large area. This pressure resulted in the Government procurement team adopting a procurement and supply approach, disregarding the actual demands, leading to over purchasing or purchasing at above market prices. These unnecessary purchasing protocols by the Chinese government led to serious delays in the delivery of urgent humanitarian supplies after the Wenchuan earthquake (Miao et al. 2013). For example, the delivery of medical supplies took a long time as the staff involved in procurement were unfamiliar with such supplies.

7.3.5 Evaluation of the Government Response to the Humanitarian Supply during the Wenchuan Earthquake

The humanitarian materials supplied to the affected areas were not supplied on a needs basis. This created a mismatch between what the affected people wanted and the actual deliveries made. An efficient response to humanitarian supply is supposed to take into consideration the needs of the affected people. Despite the magnitude of the earthquake, the Government rescue team should have obtained information about the needs of the people before providing actual supplies. The earthquake covered a vast area affecting 44 districts (Chinese Ministry of Civil Affairs 2008). Therefore, people from different areas required different humanitarian needs. However, the failure to obtain such information about these humanitarian needs resulted in a mismatch between what was supplied and the actual demands. As described in the interviews:

“...Most of the supplies donated were food and water, the demands for medical equipment and clothing were not adequately met.”

(Interviewee No.7 2014)

The unnecessary purchasing protocols implemented by the Chinese Government led to serious delays in the delivery of urgent humanitarian supplies (Miao et al. 2013). For example, the delivery of medical supplies took a long time as the staff involved in procurement were unfamiliar with such supplies, thus demonstrating a lack of skills amongst the staff in the departments that handle procurement in the Chinese Government. These issues contributed to delays in providing the essential medical supplies that were vital to the survival of the victims.

Fourthly, the warehouses where the emergency goods were stocked were overwhelmed by the large-scale and divergent demands of the affected people (Li n.d.). The humanitarian supplies ran out, leading the Chinese Government to launch an appeal for donations. These contributed to the delay in providing the humanitarian supplies and indicated that China was not adequately prepared to handle a disaster of this magnitude

7.4 NGOs in China

7.4.1 China Red Cross

Non-governmental organizations (NGOs) have become increasingly important. Under the influence of globalization and increasingly serious global problems which have established inseparable connections that individual countries or the government cannot solve, it is necessary for international collaborations to handle these issues. NGOs with their rich experience and technology play a very important role in offering environmental protection, supporting refugees, and responding to natural disasters, amongst others.

In China, NGOs started appearing after 1948 which was much later than in western countries. However, this emergence of NGOs also corresponded with the global trend. NGOs in China developed over four distinct phases: 1949—1966 - Initial phase: several social groups established, such as the National Youth Union; 1966—1978 - the Lag phase; 1978—1995 -Developing Phase; and 1995 until now: the rapid development phase (Zhao 2003).

The economic Reforms in the Chinese State and society as a whole have contributed to the development of government NGOs in China (Yang 2005), and these reforms have led to the State appreciating these NGOs and their activities. The government has sponsored the creation of government NGOs (Deng 2001) and has offloaded some the functions of government services provision onto these NGOs. The Chinese Government hopes that NGOs will develop in the social development sphere and mobilize resources supplementing its spending (Yang 2005). However, the development of overseas NGOs in China has taken a much slower pace over the years due to factors such as policies and restrictive regulations. These have hindered overseas NGOs from developing and performing their functions properly in China. Examples of such policies include the detailed registration process and regulations on finances which affect their performance.

7.4.1.1 Registration of NGOs in China

Despite the policies and restrictive legal conditions introduced and implemented by the Chinese government against NGOs, new NGOs continue to be registered in China (Edele 2009). However, most NGOs in China are established by influential people in Chinese society who have connections with the Government, although registering an NGO in China with the Ministry of Civil Affairs is not easy, even for influential people (Saich 2000). For an NGO to get government subsidies from the Chinese Government, it has to be sponsored by the government or party department (Whiting 2011). This complicates the situation even for influential people, because it is almost impossible to

get Sponsorship from the Government or a party department. Moreover, the government pays the employees of government NGOs (GONGOs).

To register an NGO in China is a daunting process. The NGO has to abide by the Social Organizations registrations and Administration Act (25th September 1998) (State Council 1998). The aim of this Act is to guarantee the citizens' freedom of association, safeguard the legitimate rights and interests of social groups, strengthen the registration and management of social organizations, promote the construction of socialist material civilization, and spiritual civilization. These regulations are applied in the form of a formula (State Council 1998). The Act gives the following provisions (Wang and Wu 2005):

- ❖ The NGO must have a regular business location with full-time employees
- ❖ Capital of more than 30,000 RMB
- ❖ Apart from the Civil Affairs office, there must be another three to four government departments that supervise the NGO
- ❖ There must be documents with an official stamp as a sign of approval from all the government agencies that act as supervising offices.

The process of registering NGOs in China is subject to the above procedures and conditions. The government has to put in place strict and complicated procedures of registration. These stringent standards contribute to the increased number of illegal NGOs in China because it is difficult to satisfy the conditions (Percival and Zhao 2014).

7.4.1.2 China's largest NGO - China Red Cross

The China Red Cross is one of the largest NGOs in China and is directly led by the State Council. It was established in 1904 to conduct humanitarian and social relief services. Since its establishment, it is on the front line in conducting internal and international relief activities (Red Cross Society China n.d.). In 1993, the National People's Congress officially promulgated the Red Cross law that offered a legal shield to the organization and its operations (Cagney and Ross 2013). Moreover, the Chinese Government has supported China Red Cross through sponsorship and funding, the main reason being so that the government can offload some functions to GONGOs. The Chinese government has the hope that GONGOs will develop in the social development sphere and mobilize their resources thus supplementing its spending (Yang 2005).

The China Red Cross is in the category of GONGOs. Although the Red Cross directs its reports to the State Council, the diversity of its roles/tasks has also encouraged the organisation of activities with officials in other departments, such as the health department. For several years, the organization has been an actual government agency operating as a branch of the Chinese Ministry of Health. It is one of the GONGOs that has been allowed by the Chinese government to mobilize contributions from Chinese citizens (Ashley and He 2008). The organization has the advantage in that it obtains support from the Government.

“The Red Cross is able to collect adequate funds from the government compared to other local NGOs. Firstly, the central government donations are supposed to be channelled to the China Red Cross. Secondly, there is a policy directing central government enterprises and private enterprises to donate directly to the China Red Cross. Thirdly, it's the only organization with a mandate by the Chinese government to collect funds from the public.”

(Interviewee No.11 2014)

7.4.2 Response by Chinese NGOs during the Wenchuan Earthquakes

After the Wenchuan earthquake, the China Red Cross took actions which are analysed here according to the finance/budgeting allocation and the delivery of humanitarian supplies.

In response to the Wenchuan earthquake, the citizens of China contributed generously, and they channelled their resources and funds to the China Red Cross. According to Interviewee No. 11, the organization disbursed funds to local NGOs for the first time:

“Despite a lack of transparency by the China Red Cross, there were still billions of Yuan donated by Citizens to the China Red Cross, although some of funds were not accounted for.”

(Interviewee No. 12 2014)

“However, the billions of Yuan mobilized to facilitate response to Wenchuan earthquake was not properly accounted for, a fact that made many citizens lose trust in the Red Cross.”

(Interviewee No.12 2014)

Immediately after the Wenchuan earthquake, the China Red Cross launched an emergency disaster response plan to execute its rescue operations and the delivery of humanitarian supplies (Kien 2012). The Red Cross Society of China headquarters in

coordination with the Sichuan branch and other branches started to administer humanitarian aid by sending a rescue team to these areas. In addition, its Doctors without Borders team were dispatched to all the affected areas to treat the thousands of injured people (Kien 2012).

China Red Cross mobilized funds from the donations of Chinese citizens. The funds enabled the organization to conduct relief operations and provide funding to other grassroots NGOs (Interviewee No.12 above). The China Red Cross funded grassroots NGOs like Global Village to facilitate post reconstruction activities such as building houses for communities in the villages.

However, the citizens of China expected more from the organization in terms of properly managing the donated funds. According to Interviewee No. 11, there was a lack of transparency and accountability in terms of the billions of Yuan that the organization received in the form of donations. Citizens lost trust in the organization due to its poor management of public funds after the Wenchuan earthquake.

"The public were angry and raised queries over the management of the billions of Yuan donated to the China Red Cross. Subsequently, people preferred to donate to other charity organizations due to this lack of trust."

(Interviewee No. 12 2014)

In addition, professional rescue staff from the China Red Cross conducted brief training to community volunteers. Such training was important in responding to the large scale number of people who needed urgent attention:

“China Red Cross officials from all the branches in the Country conducted rescue operations, and the professional rescuers conducted brief training for the volunteers.”

(Interviewee No. 12 2014)

It can therefore be reasonably concluded based on the information obtained from the interviews that the response to the Wenchuan earthquake by the China Red Cross was not efficient. The funds collected were misappropriated, and the management did not respect the will of the citizens who generously donated to the organization.

7.4.2.1 Alliance of Local NGOs during the Wenchuan Earthquake

NGOs in China do not execute their day-to-day operations in joint alliances. However, immediately after the Wenchuan earthquake, grassroots NGOs formed alliances to provide humanitarian aid and disaster recovery. This was called the ‘5.12 Alliance’ and was established in Chengdu City of Sichuan Province. The alliance managed to raise and transport relief materials, provide urgent training to volunteers and conduct post psychological support (Wang n.d.). The alliance of these NGOs assisted the Government in disseminating information to websites, blogs, and information hubs, and their members came out in large numbers to conduct fund raising and blood drives (Roney 2011). The main agenda of the alliances was to facilitate mobilization and the delivery of relief materials, and recruiting and conducting training to volunteers as individual NGOs did not have the capacity.

However, the alliances did not last more than four years after the earthquake (Hu 2013). Factors such as political pressure from the government, funding shortages, and poor leadership contributed to the failure of the alliances. Mostly the alliances were terminated as a result of the restrictive NGO regulation regime in China that limited

their capacity and continuity. In any case in 2016 the Chinese Government issued a new regulation to include NGOs in any disaster management.

The China Red Cross response was immediate, noticeable and unique, and it comprised of a diverse gathering and collection of many organizations in China (Yang et al. 2016). It gave a uniting platform whereby local NGOs, international NGOs, private enterprises, and volunteers merged (Chen and David 2011). The NGOs' response was efficient and demonstrated that there is an increasingly refined and professional NGO sector in China. The following dimensions described below, illustrate that the response by NGOs was positive, unique, and noticeable.

- **Partnerships and Networking**

A vital dimension of the response demonstrated by NGOs was that NGOs engaged with local governments, the private sector, and volunteers effectively, and such a partnership was important in boosting the capacity and legitimacy NGOs which had been previously lacking (Brenner and Joshua 2010). This enabled the NGOs and all other government organizations to penetrate the earthquake zones to give relief support. Indeed, the alliance made the relief and emergency response achievable. In addition, another vital dimension of the response provided by NGOs was that they formed an earthquake relief-coordinating centre. This provided an avenue to coordinate all the efforts and make the response a success.

“Grassroots NGO formed the 5.12 Alliance and agreed to establish an emergency response centre. The centre mobilized resources and acted as a central point where they met and obtained briefings on the rescue operations.”

(Interviewee No. 11 2014)

The primary objective of the partnership networking was to secure the required materials and channelling it to the earthquake regions. The partnerships and networking brought the operations of the NGOs to the same level as the government due to combined synergy.

- **Provision of Real-time information**

NGOs posted information on their websites about the rescue operations for the thousands of affected victims. The emergency centre established by the alliance acted as an information centre where updates on progress could be provided. Such information was then posted on the NGOs websites and many people from all over the world subsequently relied on this real time information.

This information dissemination was effective compared to that provided by the government which was not real-time due to the damage to the communications infrastructure.

“The media was affected since damage to the communications infrastructure resulted in the delay to Government information updates. The majority of people from all over the world relied on information posted on NGO websites, and donations were made based on such information. NGO employees from all parts of the country could easily receive this information compared to information from the government, because they did not need to follow any report procedures and it was easier to reach the NGOs employees to provide the information.”

(Interviewee No. 10 2014)

Interviewee No. 10 also argued that the online information proved to be crucial to provide humanitarian relief in a timely manner. The international community and well-

wishers made contributions to the appeal launched by the NGOs on their websites (Interviewee No. 10 2014).

- **Mobilization of funds and resources**

The NGOs conducted a fund drive based on individual organization capacity, alliances, and by appealing for assistance to the world and well-wishers through information posted on their websites.

“We posted our bank account and warehouse address online in order to receive relief funds and goods from very kind people.”

(Interviewee No. 10 2014)

The funds and resources that were mobilized facilitated efficient rescue operations and the procurement of humanitarian supplies that were disbursed in a timely manner to the affected areas.

7.4.3 How China’s Red Cross handled the humanitarian supply chain during the Wenchuan Earthquake

The Chinese Red Cross established a good network with all the emergency warehouses as dictated by the disaster preparedness strategy in China (Altay and Green 2006). These are large centres positioned at strategic positions around the country, filled with essential emergency resources necessary in a disaster such as the Wenchuan earthquake. These centres formed a very critical part of the humanitarian supply chain that the China Red Cross relied upon during this disaster. They provided a large portion of the aid material and emergency resources necessary for the humanitarian effort, especially since a large part of the communication and transport infrastructure was destroyed.

China Red Cross also made use of another major part of the humanitarian supply chain - the existing transport and communication infrastructure. These logistics required in the humanitarian effort suffered from inadequacy mainly due to the devastation caused by the earthquake. However, China Red Cross created partnerships with other humanitarian organizations on the ground as well as other stakeholders to create an emergency infrastructure to assist in disseminating resources and aid to the affected and remote regions. Any infrastructure that could not be created was provided by the military, whose role in complementing the remaining portions of the communications and transport infrastructure was invaluable. At one time, the Chinese military provided more than 100 military helicopters to assist in large scale airlifting operations, which is an invaluable resource in all humanitarian supply chains (Thomas and Fritz 2006). Therefore, the China Red Cross liaised with all stakeholders to re-establish a conventional communications and transport infrastructure in order to complement the Wenchuan Earthquake humanitarian supply chain.

While handling the humanitarian supply chain during the Wenchuan Earthquake, the China Red Cross encountered a shortage of major stock that included the emergency resources necessary during the humanitarian effort. One reason for these circumstances was the unforeseen magnitude with which the earthquake affected the country and its economy (Kovács and Spens 2007). First, more than 60,000 people lost their lives, while more than 300,000 suffered injuries of varying degrees. Second, there were millions of people who had been left homeless and destitute after their homes and all supporting infrastructure came under the force of the earthquake's devastation. Unfortunately, the emergency warehouses at the state and county level established as part of the Chinese Government's disaster preparedness became overwhelmed. Therefore, China Red Cross, in collaboration with other NGOs, established alternative resources and auxiliary supply chains to meet these demands.

Immediately the magnitude 7.0 earthquake hit, the China Red Cross sent out a team of experts to assess the humanitarian and aid needs of the victims and those affected. The

first issue identified by the Red Cross in its post disaster impact assessment was the shortage of professional personnel and staff to deliver the relief goods. Hence, the Red Cross decided to implement courses and training to ensure that the onsite volunteers were capable and able to deliver the relief work.

The training delivery initially targeted priority groups, hence the military police, and medical and technological focused groups were the first priority groups to receive training. But then this was opened up to as many people as possible to increase the capability of the emergency response team (Christopher and Tatham 2011). Although the China Red Cross consisted of a formidable force of well-trained emergency response personnel to face any disaster scenario, this earthquake's demands substantially exceeded their resources of supply chain personnel. Therefore, the China Red Cross decided to complement this personnel shortage by conducting crash courses and training on-site to volunteers. Priority was given to those with military, police, medical, and technological training, but training was mostly indiscriminate and intended to establish a bigger emergency response personnel team. Thus the China Red Cross responded to the excess demand on the Wenchuan humanitarian supply chain for emergency personnel by training volunteers. This decision demonstrated a keen awareness of the relationship between humanitarian supply chain demands and the efficiency of the same supply chain.

One important aspect of the humanitarian supply chain that distinguished it from the conventional business organization-based supply chain was the absence of any profit-based objectives (Christopher and Tatham 2014). Unlike the conventional supply chain, the humanitarian supply chain is more concerned with creating efficiency in the flow of emergency resources and personnel between sources such as the government, NGOs, and donors, and their beneficiaries who are the victims and those affected (Thomas and Kopczak 2005).

Additionally, the flow of information is an important aspect of any large scale disaster such as the earthquake that struck Wenchuan. Consequently, the China Red Cross initiated almost immediate initiatives to re-establish the communication infrastructure that the earthquake had destroyed. In doing this, the organization based its humanitarian efforts and all humanitarian supply chain planning on perceived needs as opposed to standard practice. The commonly accepted practice in such circumstances is to investigate the needs of the beneficiaries and create a supply chain to enable these provisions to reach them (Wassenhove 2006). However, mismatches led to redundancies in the humanitarian supply chain as some supplies were replicated, leaving the most needy inadequately supplied. Therefore, the China Red Cross, as well as many other NGOs who reacted to the Wenchuan earthquake in 2008, did not respond to the demands of their humanitarian supply chain in the correct manner. Their choice to rely on perceived needs led to redundant humanitarian supply chains that replicated some emergency resources, while creating artificial shortage in others, including critically needed medical supplies.

7.4.3.1 Analysis and criticism of the role of humanitarian supply chain management in the disaster cycle

The relationship between the humanitarian supply chain management and the disaster lifecycle is evident even in the definition of the two concepts. Humanitarian supply chain management is a branch of supply chain management that targets disaster management and recovery by complementing humanitarian efforts through efficient supply chains (Long 1997). The main objective in humanitarian supply chain management is the creation of supply chains that identify emergency needs in disaster scenarios and avail the resources and personnel needed in a just-in-time (JIT) fashion. On the other hand, the disaster cycle is a conceptual framework that defines the various stages of a disastrous scenario from the perspectives of humanitarian effort, disaster preparedness, and emergency response (Cozzolino et al. 2012).

In analysing how the processes involved in humanitarian supply chain management engage in the disaster cycle, delineating the disaster environment is a necessity. The disaster cycle achieves this by breaking down all disasters into four major phases:

- The mitigation phase – this is the stage where government-based and the social infrastructure are created in order to overcome society's vulnerability to disasters and their effects (Scholten et al. 2010). These are mainly the prerogative of the government and other main stakeholders that the society has elected with all the responsibility of assessing and tending to its needs.

From the perspective of the relationship between the mitigation phase of the disaster cycle and humanitarian supply chains, the mitigation phase offers little wriggle room for the later. Due to the fact that the government and other major stakeholders are those on which society has placed the responsibility of establishing a mitigation infrastructure against disasters, the humanitarian supply chain has little influence on this phase (Altay and Green 2006). The only thing these supply chains can do is augment the existing mitigation infrastructure during a disaster in the event that they are rendered incapable either by the disaster itself, or overwhelmed by the effects of the disaster as was the case in the Wenchuan earthquake. Therefore, the role of the humanitarian supply chain in the mitigation phase of the disaster cycle is mostly reactive. Using the Wenchuan earthquake to exemplify this, we see that the China Red Cross was part of the advice team that the government consulted on in order to understand how best to mitigate the consequential disaster following the main earthquake since large tremors followed for months.

- The preparation phase – this phase of the disaster cycle is the last before a disaster strikes and involves all preparations made by stakeholders while anticipating disasters in disaster-prone environments (Pettit and Beresford 2005). Strategies for disaster response, resource allocation, and personnel preparation all form part of the preparation phase of the disaster cycle. The government collaborates with experts and other stakeholders and designs physical networks for this particular reason (Lee and Zbinden 2003). Information, transport, and communication systems are designed around the identified probabilities as well as collaborative partnerships.

Looking into the characteristics of this disaster cycle, one can see that the humanitarian supply chain had more roles to play here. Firstly, during the planning phases involving the physical network, a lot of attention was directed towards the supply chain factors that might affect the network's efficiency (Thomas 2003). For example, the distance between the emergency warehouses might affect the entire humanitarian's agility and ability to respond to consequential disasters (Cottrill 2002). Second, given the importance of communication on the effectiveness of supply chains, the setting up of communication infrastructural systems in preparedness strategies must include those that address humanitarian supply chain concepts. The ability to communicate

affects a humanitarian supply chain's agility among other crucial aspects. Last, the establishment of collaborative partnerships during the preparation phase of a disaster cannot exclude humanitarian supply chains given their importance in all disaster scenarios after they occur (Nisha de Silva 2001).

Considering the importance of the humanitarian supply chain in the preparation phase of the disaster cycle for the Wenchuan earthquake, we identify various confirmatory examples. China Red Cross, part of the larger humanitarian supply chain that served this disaster, had various emergency warehouses that served as part of the preparedness of the country to the earthquake disaster. Additionally, the communication factor became apparent when first responders on the site communicated an almost instantaneous need for addition personnel leading to the organization training volunteers (Jahre et al. 2009). Coordination frameworks, which are an essential part of the preparedness phase of any disaster cycle, became apparent when the China Red Cross joined hands with the military, media, and other NGOs during the Wenchuan earthquake.

- The Response phase – this is the actual reactionary phase of the disaster cycle where all the mechanisms, resources, and strategies aimed at responding to the effects of disasters come into play. Considering that the response phase of a disaster occurs after the disaster occurs, this phase has two distinct sub-phases, the immediate response sub-phase, and the restore sub-phase (Balcik et al. 2010). The former refers to all the processes of activating the sleeping network of systems, mechanisms, and policies related to disaster preparedness and response. The later refers to those processes aimed at the provision of basic humanitarian aid and emergency resources to their beneficiaries. The humanitarian supply chain benefits the restoration phase of the disaster cycle during both sub-phases. At the immediate response sub-phase, the effects of the humanitarian supply chain comprise of all the activities revolving around initiating the supply routes and processes that aim to awaken dormant humanitarian activities and systems (Maon et al. 2009). From the case study of the Wenchuan earthquake, the humanitarian supply chain management practices initiated as part of the immediate response included ambulatory services, the establishment of transport lines, and alternatives for other infrastructural systems. Additionally, the creation of donor and aid partnerships came into play as well as partnerships with crucial partners such as the media and military.
- After the immediate response sub-phase, the humanitarian supply chain management process in response to the Wenchuan earthquake disaster established supply routes and systems to deliver basic humanitarian needs such as food, clothing, shelter, and related basic needs. Afterwards, organizations such as the China Red Cross coordinated with the government and other major stakeholders to establish alternative means of survival for those affected, while working to re-establish clean water and food sources, alongside medical centres for victims.

- The reconstruction phase –this phase of the disaster cycle includes all the activities that are aimed at restoring the social, economic, and natural order of the site of the disaster (Tomasini and Van Wassenhove 2009). This phase also aims to rehabilitate the victims as well as their survival mechanisms, including the natural environment. During the reconstruction phase of the disaster cycle, most organizations and even individuals might undergo modal changes such as strengthening their infrastructural resilience and using more stable building materials.

The humanitarian supply chain management practice assists this phase of the disaster cycle by providing all those involved with an efficient method of moving the required material and manpower to assist in the reconstruction. It also meets these needs in an efficient manner to reduce the impact of the huge cost of rehabilitation such as that incurred by the Chinese government after the Wenchuan earthquake in 2008. Humanitarian supply chain management also extends to clean-up exercises that aim to clear debris as well as create continuity in the process of seeking the missing, and collecting dead bodies that characterize such devastation (Sheffi 2005). Without the efficient supply of materials and the personnel needed in such crucial rehabilitative processes, disaster recovery efforts would not be a reality.

Additionally, one should note that the humanitarian supply chain assumes lean and agile models like the conventional supply chain. However, humanitarian supply chain management models do not use these two aspects of supply chain management in a similar manner since their main objective is not profit-oriented. Leanness in humanitarian supply chains refers to the ability of the supply chain to achieve more without addition, in terms of investment through funds, materials, or manpower (Taylor and Pettit 2009). On the other hand, agility within the humanitarian supply chain refers to its ability to meet unexpected changes in demand due to, among other things, shorter lead times.

7.4.3.2 Supply chain strategies used during the Wenchuan earthquake at the response and recovery stages

Supply chain strategies refer to those strategies that planners use during decision-making to decide on what type of supply chain to use in specific scenarios, in order to achieve predefined objectives (Oloruntoba and Grey 2006). These objectives might be related to efficiency, the chain's ability to respond to changes in the demand and lead time, cost management, or a mixture of other reasons. Therefore, the most common supply chain strategies are lean, agile, and leagile, the latter being a mixture of the earlier two.

Lean supply chain strategies place an increased emphasis on the proper management of resources thus reducing the waste of all resources up and down the supply chain, including time (Narasimhan et al. 2006). This strategy strives to ensure a level schedule that utilizes resources evenly and without variation. Applying this to the humanitarian supply chain concept, we see that a lean humanitarian supply chain strategy will strive to save on resources by identifying the demands of its beneficiaries correctly the first time. Additionally, this strategy places a great emphasis on proper distribution channels in order to supply resources in the shortest time possible, achieve the mobilization of resources, and logistics selection, albeit there having been a disaster that might have destroyed the infrastructure.

Agile supply chain strategies place an emphasis on the ability to respond as best as possible to shifts in demands and lead times without disproportionate changes in costs and efficiency. Applying this conceptual framework, we find that the agile humanitarian supply chain strategy considers factors such as site selection, specificity of deliveries, and sensitive needs assessment (Mason-Jones et al. 2000).

Some humanitarian supply chain management scholars have suggested that a combination of these two strategies be applied in order to benefit from both. These scholars suggest the adoption of lean supply chain strategies in the upstream supply chain movement and agile strategies in the downstream movement (Naylor et al. 1999). However, the best practices according to subsequent studies and actual on-site practice seems to be an application of these supply chain strategies depending on the phase of the disaster cycle.

Considering that the Wenchuan earthquake was a sudden disaster, its disaster cycle had four phases that characterize this disaster preparedness and management concept. Here we concentrate on the response and recovery/reconstruction phases of the Wenchuan earthquake disaster from the supply chain strategy perspective.

- **The response phase**

Immediate response sub-phase

During the response phase of the Wenchuan earthquake disaster cycle, the government, NGOs, military, and other stakeholders in China's disaster response mechanism activated a sleeping network of resources and personnel that were trained to respond. Considering the sudden needs for emergency medical attention, rescue services, and the supply of basic emergency resources such as food, shelter, clothing, water, and other resources, the most applicable supply chain strategy here would have been an agile one (Kaatrud et al. 2003). The demands for these resources as well as personnel and equipment were shifting at a phenomenal rate, sometimes up to the point of overwhelming the disaster response and capability of the emergency rescue operation. Additionally, the lead times were changing as the levels of priority kept shifting due to discoveries of trapped, destitute, and injured victims.

The main type of supply chain movement during the response phase of the Wenchuan earthquake disaster was mostly downstream, meaning that the resources and personnel were moving from the donors, government, military, and NGOs, downwards to the earthquake's victims. Therefore, an agile supply chain strategy must have come in play as these agencies sought to make the right deliveries the first time (Thomas and Fritz 2006).

Furthermore, these sources were required to make site selections, as well as choosing the needs of those most vulnerable such as children and the injured. Therefore, the supply chain strategy adopted by NGOs such as the China Red Cross and Global Village, as well as other stakeholders such as the military and government must have been more of an agile model.

The establishment of donor partnerships as well as efforts to identify the specific needs of those affected also demonstrate the implementation of an agile supply chain strategy. The stakeholders strove to identify the most efficient methods of delivering the emergency resources and personnel they thought would be needed in the disaster hit areas. Additionally, these stakeholders identified the best sites for an increasingly efficient supply chain, once more demonstrating the characteristics of an agile supply chain strategy (Charles, Lauras and Van Wassenhove 2010).

Restoration sub-phase

This sub-phase of the response phase of a disaster cycle seeks to establish supply chains that support all of the activities aimed at supplying those affected and injured with basic necessities in large numbers, with the right supplies, and in the most efficient manner. This sub-phase assumes an agile supply strategy as demonstrated in the Wenchuan earthquake disaster when the China Red Cross, the military, and international donors identified the basic needs as medical care and supplies, food, shelter, clean water, warm

clothing, and the implementation of emergency personnel. The stakeholders adopted an agile supply chain strategy that sought to deliver these basic needs to as many people as possible using the most efficient methods (Thomas and Kopczak 2005). One demonstration of the government's efforts to achieve efficiency and a timely delivery was the military's implementation of more than 100 helicopters to complement the airlifting operation that was underway. Additionally, the China Red Cross established centres in the region where they stocked up on essential resources that they perceived to be important. Although there were mismatches with what the beneficiaries eventually required due to a redundant supply chain and a lack of adequate research into their actual needs, these actions demonstrated an agile supply chain in the disaster's humanitarian efforts.

- **The recovery/reconstruction phase**

This is the second sub-phase of the reconstruction phase in a disaster cycle. Applying this to the Wenchuan earthquake disaster, we see that the recovery phase included all efforts aimed at rehabilitating the victims and returning them to a state of life that supported their survival. Based on the characteristics of the disaster, the donors strove to ensure that all bodies had been recovered, while the victims or beneficiaries of all humanitarian supply chains had some form of survival kit in the form of 2,000RMB per family to assist them to reconstruct their lives as the government set about implementing major reconstruction projects. Additionally, all the survivors who had recovered from their injuries were requested to shift to safer areas and were facilitated in doing so through transport and fiscal means (Global Humanitarian Reform 2007). The donors continued directing resources and manpower towards those still affected by the disaster and strove to ensure there was minimal wastage due to the limited resources remaining. Additionally, clean-up exercises began. All these steps are in-line with a lean supply chain strategy.

These examples are aligned with the objective of creating a supply chain from donor to beneficiaries in the most efficient manner and with the least amount of wastage possible. By reducing the number of people relying on direct assistance, the donors for the Wenchuan earthquake disaster reduced wastage as the remaining resources went to the most deserving cases. Additionally, a small stipend of approximately 2,000RMB per family affected also demonstrated the donors' intention of keeping the resources allocated to the most sensible minimums possible. Needy cases were then assessed to ensure that their allocations were right the first time, especially for expensive and scarce resources such as medical supplies, shelter, clothes, and clean water. Additionally, the donors established that an increase in airlifting capacity would overcome the logistical issues they faced, thus demonstrating a concern for logistics, a major sign of the lean supply chain model being utilized (Christopher 2005).

Evaluating the donors' responses to the Wenchuan earthquake from the perspective of supply chain strategy, we find that their initial plans were very good. Even a scholarly investigation of the rationale behind applying an agile supply chain during the response, and a lean supply chain during the reconstruction/recovery supports that their actions as being appropriate. The death toll from the consequences of the earthquake would have increased due to injuries and disease had these strategies been mixed up. Additionally, limited resources were used appropriately in most cases. However, there were cases of misappropriation, especially during the recovery stages as the international community complemented the donor capability with resources.

7.5 Discussion of the Key Challenges and Recommendations

The challenges that hinder a government and NGOs in an efficient humanitarian response to a disaster are described in Figure 7.6. The next section attempts to provide recommendations in response to these challenges.

Challenges	Recommendations
Lack of preparedness and planning during the preparedness phase	1. Build capacity by training rescue officials 2. Conduct emergency drills frequently
Lack of real time humanitarian information during the response phase	1. Upgrade mobile satellite systems 2. Upload and update disaster information on government websites promptly
Poor management of donations	1. Supply of donations needs to be on a needs basis
Inevitable delays in response due to damaged infrastructure	1. The government to train and build capacity of community members
Poor management of humanitarian supplies during the preparedness phase	1. Dynamic procurement department 2. Establish an efficient and flexible supply chain alliance

Table 7.6: Key challenges experienced by the Chinese Government

7.5.1 Government Challenges and Recommendations

- **Lack of preparedness and practice during the preparedness phase**

After the Wenchuan earthquake had stricken Sichuan province, the Central, and the local government immediately established an earthquake emergency response headquarters (Chinese Ministry of Civil Affairs 2008). The main objective of these centres was to act as command centres in enhancing a faster and more efficient disaster humanitarian response. However, despite their best-dedicated efforts, the working productivity of the involved government officials, rescue teams, and agencies was

undoubtedly less than expected. Examples of situations that support the argument that the government lacked preparedness and practice include:

The rescue efforts were not efficient as the number of professional rescuers was not sufficient compared to the number of affected people that needed attention (Chinese Ministry of Civil Affairs 2008). Medical doctors and rescue officials with skills in offering psychological support were supposed to be provided in large numbers. These demonstrate a lack of preparedness by the Chinese Government in responding to disasters of such magnitude (Chinese Ministry of Civil Affairs 2008).

The earthquake affected many people as it had covered a large scale area of 44 neighbouring counties (Chinese Ministry of Civil Affairs 2008). The rescue officials were overwhelmed due to divergent humanitarian needs as the victims from different counties needed different types of aid. The rescue teams delivered supplies disregarding the specific needs of the various areas, which clearly demonstrated a lack of preparedness and practice by the rescue officials.

Recommendations: The Chinese government needs to boost the preparedness and capacity of their rescue staff through training and implementing emergency drills. These will sharpen the skills and practice in readiness for any possible natural disasters. In addition, the rescue officials should supply humanitarian aid based on the specific requirements of the affected people.

- **Lack of real-time Humanitarian Information during the response phase**

It is vital for the Chinese Government to provide accurate and real-time information to the public and the international community. Destruction of telecommunications and power lines during the Wenchuan earthquake affected the communication between the

government agencies and the rescue teams (Chinese Ministry of Civil Affairs 2008). Satellite mobile technology utilized by the military was overused which led to the system jamming. In addition, power failures affected the media's ability to disseminate information to the world, such as information on the level of destruction and the humanitarian assistance needed. People from all corners of the world depended on real time information posted on the websites by international and local NGOs.

Recommendation: The government needs to upgrade its satellite mobile technology to avoid the risk of the systems jamming. In addition, the government should establish a single information coordination platform that will have the mandate of informing the world. To avert the situation of infrastructure damage causing a breakdown, information could be posted on Government websites through the information coordination platform.

- **Poor management of donations**

The number of donations from the Chinese citizens and the international community was huge (Chinese Ministry of Civil Affairs 2008). These supplies were channelled to designated locations that were affected by the earthquake for sorting and later release to the victims. Regrettably, the relief volunteers and the government aid personnel were overwhelmed by the large stock of donations received. The rescue staff from the government lacked the necessary donation management skills, leading to the poor distribution of humanitarian supplies to the victims (Zheng 2009)

Recommendation: The Chinese Government should advance the management of donations to ensure they are needs driven. This will avoid a supply driven approach and thus eliminate mismatches between the demand and the actual materials supplied. Undoubtedly, proper management will provide a systematic flow in terms of the delivery and distribution of humanitarian supplies. Also, it will ensure that the

donations received meet the gaps in terms fulfilling demand and thus avoid the oversupply of certain materials, while disregarding other materials that are required. Such information should be shared with the media, emergency response institutions, NGOs, and any other relevant platforms.

- **Inevitable delays in response due to damaged infrastructure**

The area where Wenchuan earthquake struck was poorly covered by roads as the location is mountainous (Chen and Booth 2011). The lack of a road network hampered the rescue efforts and there were inevitable delays. In addition, the lack of necessary equipment to move debris from the destroyed roads and railways led to physical hindrances for the emergency logistics, which resulted in severe limitations on movement. These factors contributed to delays in deploying rescue officials to the affected areas.

Recommendation: The Chinese Government needs to build the capacity of the community search and rescue teams. The search and rescue teams should also train to respond to disasters occurring in urban or rural/mountainous areas. This will boost the speed at which rescue operations can be implemented, as community members can undertake first responder rescue actions. Therefore, the Government should establish permanent community-based rescue officials as a strategy for saving lives and avoiding the impacts of the inevitable delays that are caused by a damaged infrastructure.

- **Poor management of humanitarian supplies during the preparedness phase**

Unnecessary purchasing protocols by the Chinese Government led to serious delays in the delivery of urgent humanitarian supplies after the Wenchuan earthquake (Miao et al. 2013). For example, the delivery of medical supplies took a long time as the staff involved in the procurement were unfamiliar with such supplies. Which meant they did

not know how to obtain such large amounts of medical supplies; thus illustrating the lack of skills amongst the staff in the departments that handle procurement for the Chinese Government. These issues contributed to delays in providing essential medical supplies that were vital to the survival of the victims. It is noted that instances of insufficient medical humanitarian supplies being available undoubtedly increased the level of the fatalities and injuries.

Recommendation: The demand for humanitarian supplies is difficult to forecast because no one can predict the magnitude of a disaster (Kovacs et al. 2007). However, it is important for the Chinese Government to implement a dynamic procurement department and an efficient supply chain alliance. This supply chain alliance needs to be flexible and be able to make deliveries within the shortest time possible. The public-private partnership (PPP) is the best approach to building such a long term arrangement, and boosts the proper integration between the government and private enterprises. When a natural disaster like the Wenchuan earthquake occurs, such enterprises form a flexible supply chain, where materials are delivered based on demand. This eliminates the risks of oversupply or undersupply of humanitarian supplies. The performance of such private enterprises should be evaluated to identify any shortcomings in order to make future improvements.

7.5.2 Key challenges experienced by China NGOs and Recommendations

Challenges	Recommendations
a. Unfriendly policies and regulations for registration and operations	1. Chinese Government to relax its tough policies and regulations on NGOs
b. Inadequate professional rescue teams	1. NGOs in China to implement projects that train the community to offer professional rescue services

<p>c. Duplication of roles and response</p>	<ol style="list-style-type: none"> 1. NGOs to share responsibilities when responding to disasters to avoid duplication 2. Distinguish/agree responsibilities during and post disaster
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Table 7.7: Key challenges experienced by China NGOs and Recommendations

- **Unfriendly Policies and regulations by the Chinese Government:**

NGOs were very active in the humanitarian response during the disaster. The grassroots NGOs formed alliances in response to the requirements for humanitarian aid and disaster recovery. The alliances managed to raise and transport relief materials, provide the urgent training of volunteers, and conducting post psychological support. However, the operations of NGOs in China are restricted by the policies and regulations of the Chinese Government (Saich 2000). These restrictions limit their capabilities, and their ability to coordinate with the government in the execution of an efficient emergency response. Such policies limited the number of international NGOs that were actively involved in the humanitarian response.

Recommendation: There is an urgent need for the Chinese Government to recognize the social services provided by NGOs. It is important therefore that the Chinese Government relax its tough policies and regulations that discourage the registrations and operations of NGOs.

- **Inadequate professional rescue teams**

The number professionals that provided professional rescue operations such as psychological support services was not sufficient compared to the number of affected people. Most of the international NGOs provided professional rescue support by

offering psychological support services and medical support. However, the number of professional rescue teams trained by these NGOs was insufficient:

“The number of affected people was enormous, and professional services like medical support and psychological support were not well serviced.”

(Interviewee No. 11 2014)

Recommendation: NGOs in China should implement programs that aim to teach skills to people in the community so that they can help provide disaster management and response. This will assist in offering professional services and offering timely rescue operations.

- **Duplication of roles and responses among NGOs**

Many NGOs participated in the disaster response after the Wenchuan earthquake. They delivered relief materials such as food, water, and clothing. Nevertheless, duplication of roles and humanitarian supplies provides evidence that NGOs in China had inadequate emergency planning:

“There were many NGOs that travelled to the affected areas, and they provided relief supplies and conducted rescue operations. However, humanitarian supplies from the NGOs did not exhibit uniqueness as they provided the same things. There was no specific NGO that provided unique supplies such as medical equipment.”

(Interviewee No. 11 2014)

Recommendation: In order to provide an efficient response to a natural disaster, NGOs could share the responsibilities amongst themselves and thereby reduce duplication.

Sharing responsibilities will enhance the planning, and thus the emergency response will be better implemented.

7.6 Conclusion

The situation calls for attention by all Chinese Government departments to establish stable cooperation with international countries, NGOs, and other private enterprises in order to execute efficient humanitarian aid. The Wenchuan earthquake revealed that for an efficient humanitarian response, the Chinese Government cannot do it alone. Collective efforts from the government, private sector, NGOs and the international community are important. However, most importantly what contributes to an efficient humanitarian response is disaster preparedness by all, including individual citizens at the community level.

Chapter 8 Taiwan Case study—Typhoon Morakot

8.1 Introduction

Taiwan is an Island (Figure 8.1) that sits between Japan, the Philippines, and the Pacific Ocean and is a country that has frequent monsoons (Shea 2001). Taiwan is located in the earthquake belt, and the major pathways of typhoons make the country the most vulnerable place on earth to natural disasters (Tsai, Hung and Chen 2010).

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Typhoons contribute to almost 70% of Taiwan's natural disasters and these lead to human casualties and economic losses (Teng 2006). The occurrence of typhoons in Taiwan has increased from an average frequency of 3.3 times annually in the 20th century to an average frequency of 5.7 times annually in the 21st century.

The map below Figure 8.2 shows the storm path that originated from the Pacific Ocean on the 3rd August 2009. Convective clouds were already formed when it hit Taiwan on the 9th August 2009 (Wang 2009). As the typhoon closed in near Taiwan, the

strengthened flow of the southward winds passed Taiwan around the Pingtung and Kaohsiung areas (Wang 2009). The north and south winds created a convergence zone that caused torrential rains in the areas indicated by the green marks on the map below. The three-day accumulated rainfall had a severe impact that affected the humanitarian relief efforts. The map below shows the path the Typhoon took that originated from the Pacific Ocean on the 3rd August and struck Taiwan on the 9th August 2009. The green areas represent the areas most affected by heavy rainfall (EU Joint Research Commission NOAA 2009).

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Figure 8.2: The path of Typhoon Morakot and the areas that received heavy rainfall (EU Joint Research Commission NOAA 2009)

In three consecutive days, the torrential downpours led to a water level accumulation of 2,686 millimetres, a record in Taiwanese rainfall history (Wang 2006). The mudslides buried several villages located in the mountain area. Floods mainly occurred in counties and cities on the west coast such as the Chiayi and Pingtung Counties, and the Tainan and Kaohsiung Cities. It affected 510,668 people in 146,739 households. Out of this total, 491,477 persons in 140,423 households experienced flooding to a height of more than 50cm (Wang 2009). In Kaohsiung County, there were 537 casualties in the Jiaxian, Namasia, and Liugui villages located near the mountains. Villages like Xiaolin and Xinkai in the Jiaxian Township and Liugui Township were completely destroyed by massive landslides (Chang 2012).

Furthermore, the typhoon also damaged the road infrastructure causing traffic interruptions on nine main roads. The roads were blocked by rocks from the mountains while others had their foundations destroyed (Wang 2009). 196 roads and bridges in cities like Kaohsiung and Tainan, and counties such as Pingtung and Taitung were completely destroyed. The total damage to the infrastructure, agriculture, and economic losses was nearly NT\$110 billion (US\$3.5 billion) (Cheng 2013).

The tremendous impact of the disaster required a strong emergency/disaster management system to respond and recover. Taiwan's disaster management system had been evolved over the previous few years as a result of increasing numbers of distressing experiences from several natural disasters (Tsai and Cheryl 2010). In 2000, the Taiwanese Government promulgated a disaster management law that was implemented during the Ji Ji Earthquake (1999) tragedy. After Typhoon Morakot, the Government once again promulgated a new emergency law by enacting the Disaster Prevention and Protection Act in the year 2010. The purpose of this Chapter is to examine the effectiveness of the disaster response demonstrated by the Taiwanese Government and Taiwanese NGOs during the Typhoon Morakot tragedy. This chapter will also focus on the emergency plan (Disaster Protection and Response Act) implemented during the Typhoon tragedy and evaluate it accordingly.

8.2 National Disaster Prevention and Protection Systems in Taiwan

The Disaster Prevention and Protection Act (DPPA) in Taiwan was established after the earthquake in Ji ji 1999. A few subsequent revisions were made before and after Morakot. This chapter only concentrates on the DPRA & DPPA of 2000 and 2010 respectively, since these are the most relevant to the response to Typhoon Morakot.

After the catastrophe known as the Ji ji earthquake, the Taiwan government launched the Disaster Prevention and Protection Act 2000 in order to improve the disaster management capacity. This Act provided a disaster prevention system and formal legal norms. It also laid the foundation for disaster management in Taiwan (Chu 2012), and revised the number of response levels from 4 (centre, province, municipal/county/city, and township/district) down to 3 (centre, municipal/county/city, and township) (see Figure 8.3 below). Taiwan Government subsequently incorporated a military role into the DPPA after Typhoon Morakot in (Xiao 2013). As a result of the traumatic experiences due to the frequent occurrences of natural disasters, the Taiwan Government now has advanced disaster management systems (Xiao 2013). In 2000, the Government promulgated the Disaster Prevention and Response Act (DPRA) in response to the impacts of earlier devastating natural disasters (Tsai and Cheryl 2010).

The disaster management system is dominated by the Disaster Prevention and Protection Act (DPPA). The first DPPA was launched in 2000 in response to the lessons learnt from the Ji ji earthquake in 1999. Following typhoon Morakot in 2009, a further revision was implemented to further improve the arrangements for the disaster management system.

The DPPA 2000 addresses the arrangements for each disaster management phase (mitigation, preparedness, response, and recovery) (Ma 2010). The disaster management system was previously divided into four levels (centre, province, municipal/county/city, and township/district), but was revised in 2010 to three levels after the 'provincial level' was removed (centre, municipal/county/city, and township). Although the system is only divided into three levels, the complexity of each level in the system is rather high (Ma 2010). Figure 15 demonstrates the layers.

Figure 8.3: Three levels of Government as per the DPRA Act in 2000 (Tsai and Cheryl 2010)

The top level is led by the president, while the Premier of the Executive Yuan takes the lead with decision making. Under the Executive Yuan, the operational departments can respond to different type of hazards while the NDPPC is in charge of coordination (Tsai and Cheryl 2010). However what makes the system more complex are the parallel operation committees. For example, neither EAC nor NCDR play an operational role, but providing technical advice (Tsai and Cheryl 2010). It has been argued that these committees slow down the effectiveness of a disaster response (Ma 2010).

The 2000 Act according to Tsai and Cheryl (2010) established the Executive Yuan headed by the Premier as shown in Figure 15. It supervised the DPRC, Rescue Coordination Centre, Ministry of Interior, and the National Disaster Prevention and Protection Commission (NDPPC). The purpose of the NDPPC at the central government was to facilitate the coordination across the ministries and agencies in the government (Tsai and Cheryl 2010).

Upon the occurrence of natural disasters, a specific agency, the Disaster Prevention and Response Committee (DPRCM) was established by the Central Government and Chaired by the Vice Premier. The DPRC supervised the Committee, and was in charge of overseeing the implementation of the disaster management policies and regulations (Tsai and Cheryl 2010).

In addition, the 2000 DPRA Act established two agencies that operated under the disaster prevention and response committees (Tsai and Cheryl 2010). One was the National Disaster Prevention and Protection Experts Advisory Committee (EAC) and the other was the National Science and Technology Centre for Disaster Reduction (NCDR). The two agencies were involved in giving technical advice on disaster management and disaster reduction related affairs (Tsai and Cheryl 2010).

What is notably is that the armed forces and militia were directly under the command of the president. According to Tsai and Cheryl (2010), the Act gave specifications at three levels of government to create a Disaster Prevention Council and a Disaster Prevention Plan. This was to facilitate planning, supervision, and the enforcement of disaster response work.

The DPRA 2000 stipulated that the local governments were responsible for providing punctual information on any emergency once a disaster had occurred (Tsai and Cheryl 2010). Moreover, the Disaster Prevention and Response councils at the three levels of government were supposed to urgently formulate their own Emergency Operation Centres. The purpose of the EOC was mainly to command its quick response teams established at the three levels of government (Tsai and Cheryl 2010).

8.2.1 Evaluation of the Taiwan DPRA2000

The response to Morakot demonstrated the ineffectiveness of the arrangements under DPRA 2000 (Wang 2013). Taiwanese Government officials also lacked the will to implement the emergency law, even though the law faced severe challenges (Tan 2011). The following is a summary of the main issues that contributed to the DPRA emergency systems not providing a useful response to the Typhoon Morakot tragedy.

- **Complicated communication channels between the centre and local areas**

The emergency system introduced a complicated communication channel between the local and central governments making emergency information flow slowly. Communication from the affected areas at the bottom of the hierarchy to the top management was evidently slow due to bureaucratic procedures (NCDR). According to information sourced from interviewee No. 4:

“....officials from the top of the hierarchy of the emergency system showed signs of unfamiliarity with the disaster operations.”

(Interviewee No. 4 2014)

This was caused by the slow dissemination of emergency information by the government officials at the local level. Nevertheless, the problem was caused by the emergency systems as government officials at the local level were supposed to gather information about the tragedy and forward this to their supervisors (Interviewee, No. 4). The process of forwarding information to the hierarchical systems of the emergency response contributed to unnecessary delays and a lack of clarity. However, according to interviewee No. 4:

“...even after the local residents voiced their concerns over the media the, information was still ignored by the emergency systems...”

(Interviewee No. 4 2014)

- **Ambiguous responsibility across related departments**

The existing authority structure was complex, and government officials were confused (Tsai and Cheryl 2010). The complexity of the systems led to the duplication of roles and thus led to confusion among Government officials contributing to the poor response. For example, the affairs and response to a Typhoon according to the DPRA Act were the responsibility of the Ministry of the Interior. However, Typhoon Morakot caused flooding that was managed by the Ministry of Economic Affairs as stipulated by the Act. This also resulted in debris which was the responsibility of the Executive Yuan and landslides that were under the Council of Agriculture (DPPA 2010).

- **Complexity of the organization hierarchy**

The levels of command were loosely attached, and they lacked a unified chain of command (Maa 2001). The emergency systems depicted the multiple chains of command which were derived from the three levels of the government hierarchy. As a result, information and command were delivered in a bureaucratic structure thus contributing to the slower processing of urgent information. Additionally, government officials at the three levels of government followed different rules and commands as directed within their jurisdictions. According to Interviewee No. 4:

“...government officials within the jurisdictions of the three levels of the emergency response acted in a manner based on their own priorities.”

(Interviewee No. 4 2014)

For example, the Act authorised only the President to mobilise resources and the military. The Act did not authorize government officials to mobilize resources outside their jurisdictions (Tang and Zhang 2012). The result was a slow response to the Typhoon Morakot tragedy.

8. 3 Government Response during Typhoon Morakot

Presidents Ma, coupled with the systems and administration led to challenges in the response to Typhoon Morakot (Ou-Yang and Bo 2009). It is argued that the dysfunctional and ineffective emergency response system prevented an effective response to Morakot (Cheng and Sophy 2013). While a lack of commitment to the response tasks by relevant government officials also contributed to the slow response (Tan 2011). Moreover, according to interviewee No. 1 “the heavy downpour *that continued for three days hampered...*” the rescue efforts.

However, after three days Presidents Ma’s administration only took initiatives to respond to the Typhoon disaster after it became apparent. The President inspected the meteorology and water conservancy departments and personally telephoned the Taipei City Fire Department to dispatch relief supplies. Also the President held meetings with the North County in the hope that the county could assist by providing manpower, materials, and equipment to support the south county (Ou-Yang and Bo 2009). The central government through the ministry of the interior mobilized the national fire agency to respond specifically to the disaster.

“The Ministry of the Interior through the central disaster response centre and rescue coordination centre released helicopters to conduct the rescue operations and provide supplies of relief aid.”

(Interviewee No. 3 2014)

The President mobilized more than 182,000 military soldiers who were deployed to the affected areas to evacuate thousands of stranded victims (Cheng 2013). The military under the command of the President worked closely with the central disaster response centre and rescue command centre to execute air rescue operations.

The Premier of the Executive Yuan, Mr. Liu held an emergency meeting at the Legislative Yuan to give updates on the relief efforts (Cheng 2013). The administrative authorities of the Executive Yuan reached a consensus to create a special budget to address the relief activities accordingly. Subsequently, the Executive Yuan established a reconstruction committee to coordinate the tasks of repairing the damaged water, road, and power infrastructure systems (Interviewee No. 4).

The President reversed an earlier decision by the Ministry of Defence declining aid by the International community (Ou-Yang and Bo 2009). Ministry of foreign aid made a list of requirements that included heavy lifting helicopters to response to Morakot. According to information sourced from Interviewee No. 5, approximately 59 countries responded.

“Approximately 59 countries responded to offer humanitarian aid after the Taiwanese Government launched an appeal for aid. The U.S. was one of the countries that responded positively by giving out heavy lifting helicopters.”

(Interviewee No. 5 2014)

The central government established a relief fund by creating a special budget of NT\$100 billion (US\$3.5 billion). The fund was to cater for humanitarian relief activities and post reconstruction activities. As reported by Interviewee No. 5:

“The Taiwanese Government established a fund to cater for the humanitarian rescue activities and post reconstruction activities to the tune of NT\$100 billion (US\$3.5 billion) in response to Typhoon Morakot.”

(Interviewee No. 5 2014)

8. 3.1 Evaluation of the Government Response to Typhoon Morakot

In response to Typhoon Morakot, the Taiwanese Government identified serious weaknesses in their disaster response due to the emergency systems and government officials (Ou-Yang and Bo 2009). The rescue operations by the three levels of Government were ineffective and too slow in responding to the crisis particularly within the critical 72 hours of the Typhoon disaster (Ou-Yang and Bo 2009). Most of the key leaders in the central government during the first 72 hours were attending to their own personal affairs, when the tragedy escalated claiming lives (Ou-Yang and Bo 2009).

The government took the leading role as indicated by the deployment of 182,000 soldiers to assist in the evacuation of thousands from the worst hit areas. The government also invited the international community to provide humanitarian aid, in response to which 59 countries donated relief supplies (Tan 2011).

From 7th to 9th August when the typhoon was increasing the wind speed and the level of rainfall, most of the central level government teams were unavailable. The Vice President Vincent C. Siew, Premier Liu Chao, and the Vice Premier Chiu Cheng the big three of the Executive Yuan were not available from 7th to 9th August for supervision

(Ou-Yang and Bo 2009). On 15th August when the tragedy had worsened, the President hosted a baseball game opening ceremony instead of taking command of the rescue operations (Ou-Yang and Bo 2009). This is definite proof there was a lack of a timely commitment especially amongst the top brass of the central government, which prevented an effective and efficient response to the typhoon tragedy. Instead, there started a blame game by government officials to the elected leaders and lawmakers. The following describes the main issues that contributed to the slow response by the Government (Tsai and Cheryl 2010).

- **Poor Disaster Preparedness and Planning**

The Government at all three levels demonstrated a poor and inadequate response due to a lack of disaster preparedness and planning. The military that forms an essential organ in a disaster response demonstrated they were ill-prepared for handling a disaster like Typhoon Morakot. For example, the armed forces hampered the humanitarian assistance and disaster relief. They dragged their feet in response to the tragedy as they had to wait for orders from their commander instead of quickly attending to the affected areas (Cheng 2013). When the President later mobilized them, they demonstrated a lack of preparedness in handling and dealing with donations. According to Interviewee No. 6:

“Waterproof plastic clothes were sent from the U.S. to an air base in Tainan, the military wrongly delivered them to Kaoshiung where they were not needed.”

(Interviewee No. 6 2014)

This exposed their lack of preparedness and planning on the side of the military as the goods were returned with an excuse that the soldiers *“Lacked understanding regarding the purpose of the waterproof plastic clothes”* (Interviewee No. 2 2014).

Meanwhile, the central government demonstrated poor planning by sending conflicting messages about the international appeal on aid (Cheng 2013). The Vice Foreign Minister of Taiwan turned down international aid for relief support. In addition, the Ministry of Foreign Affairs initially refused overseas support in the initial days of the Typhoon tragedy. The move by the two government officials contributed to delaying the rescue operations and efforts (Cheng 2013). According to Interviewee No. 2:

“The Deputy Minister Andrew Hsia attributed his decision to carelessness and offered to resign.”

(Interviewee No. 2 2014)

Later the President announced an embarrassing U-turn and accepted the foreign aid (Ou-Yang and Bo 2009). The ministry of foreign affairs took responsibility but assigned the blame of the poor planning to the central EOC. The President corrected the situation by claiming that the Taiwan Government had not rejected any foreign aid (Ou-Yang and Bo 2009). This scenario demonstrates poor planning and a lack of preparedness on the side of the central government in the disaster response. The government ought to have prepared policies for an international appeal in the event of a natural disaster.

- **Complicated chain of command and authority**

The DPRA Act 2000 adopted by the Taiwanese Government in response to the Typhoon Morakot disaster contributed to the slow and ineffective response by the Government (Tsai and Cheryl 2010). The emergency system was dysfunctional as it was coupled by the complicated chain of command and authority, which contributed to confusion and the delayed response (Tsai and Cheryl 2010). Government officials at the three levels followed a different chain of command and authority within their jurisdictions. For example according to interviewee No. 1:

“The President and a few government officials had the authority for mobilizing resources such as helicopters and the military.”

(Interviewee No. 1 2014)

In addition, Government officials at the regional and local levels had to seek approval from the central government. Furthermore, the military, which is the best trained in Taiwan to handle natural emergencies and disaster relief, delayed its response as it had to wait for orders, while disaster victims continued to suffer (Ou-Yang and Bo 2009). Moreover, the emergency system was comprised of elected and appointed officials. Elected officials in Taiwan had good knowledge and understanding of the local villages and could have aided the Government in the disaster response (Tsai and Cheryl 2010). But the challenge was that the appointed officials had more authority in terms of resource allocation and mobilization than the elected officials which contributed to confusion and the delayed response (Tsai and Cheryl 2010).

- **Poor information flow from the local to the central government**

Government officials at the local level according to the emergency response Act 2000 were supposed to collect information and channel it to their supervisors (Tsai and Cheryl 2010). The disaster information before being channelled was carefully examined and analysed before being directed to decision makers. This contributed to the slow response by the central government due to the disjointed flow of disaster information, which rendered the response ineffective. The process of analysing and scrutinizing the details left out crucial details as noted by Interviewee No. 4:

“Government officials at the central level seemed to be unfamiliar with what was happening.”

(Interviewee No. 4 2014)

- **Risk Communication between government departments**

The Central Weather Bureau (CWB) failed to disseminate accurate early warning information to the three levels of government. In the early stages of the disaster, the weather-monitoring department gave conflicting information regarding the volume of the rainfall in the respective areas (Tsai and Cheryl 2010). As Typhoon Morakot moved closer, the risk was not effectively communicated to the government emergency management systems. Information from the CWB was misleading as the department warned residents in the north about the storm but predicted the south would receive low rainfall (Tsai and Cheryl 2010). This information contributed to the residents and local government of the South where the Typhoon Morakot hit hard taking the situation more lightly. Moreover, the central government did not promptly authorize the southern government officials to evacuate residents in time (Tsai and Cheryl 2010). Risk communication was poorly implemented, which prevented the damage caused by Typhoon Morakot from being minimized.

8. 3.2 Disaster protection and Prevention Act 2010

8.3.2.1 Changes made to the DPRA 2000 Government Levels and Coordination

The Taiwanese Government was influenced to amend DPRA 2000 in response to the shortcomings identified during the response to the Typhoon Morakot tragedy. In accordance with the DPRA Act 2010, government organisations and operations were divided into two levels comprising of the Central and Municipal/city and the Township/district levels. The emergency systems had different authority, operations, and permissions including pre-disaster prevention, disaster response, and post-disaster

recovery and reconstruction (Taiwanese DPPA 2010). Below is a summary of the key changes to the emergency management act, from DPRA 2000 to DPPA 2010.

The DPPA 2010 replaced the three levels of government with two levels, these being the central and the county levels of government (DPPA 2010). In the event of a disaster, these two levels of government are mandated to establish a Disaster Protection and Response Council (DPRC) at the central and county levels. Also, at the central level, the national disaster prevention agency (ministry of interior), establishes the central emergency operation centre. After the formulation of the central emergency operation centre, the central government notifies the county government to establish the disaster response centre. These two levels of government are supposed to work closely in coordinating rescue efforts.

The DPPA 2010 established the central regulating authorities at the central and county levels to facilitate disaster management activities. At these levels, the authorities are the Ministry of Interior and the Municipality respectively. This law replaces The National Disaster Prevention and Protection Commission (NDPPC) that was established at the central level by the DPRA 2000. The purpose was to act as a central regulating authority by coordinating across multi-ministries and government agencies.

The three levels of government as defined by DPRA 2000 were loosely attached, and in response to Typhoon Morakot there was found to be a lack of unity of command (Tsai and Cheryl, 2010). And as a result, the information and command was delivered in a bureaucratic structure which contributed to a slower processing of urgent information (Tsai and Cheryl 2010). Additionally, the government officials at the three levels of government followed different rules and commands as directed within their jurisdictions (Tsai and Cheryl 2010). The new law establishes two pillars of government, the central and local government, which is vital for disaster emergency response. Through this new approach the bureaucratic procedures are minimized, making disaster information flow

easily between the local and central authorities. In addition, government officials can liaise and coordinate in disaster prevention and protection.

Secondly, the National Disaster Prevention and Protection Commission (NDPPC) failed in its responsibility for coordinating government ministries and agencies in response to Typhoon Morakot (Tsai and Cheryl 2010). There was confusion among Government officials which contributed to the poor response. The Ministry of Interior and the Municipality at the central and local levels respectively make the emergency response more useful. The two emergency regulatory authorities define the disaster guidelines for government agencies at the county and central levels.

- **A unified search and rescue coordination centre**

The Executive Yuan under DPRA 2000 established the National Rescue Coordination Centre at the central level of government that was not under the direct command of the disaster protection and response council (Tsai and Cheryl 2010). Furthermore, the Act established EOCs at the three levels of government. The central EOC would command the municipal EOC that in turn commanded the township EOC on issues of rescue operations (Tsai and Cheryl 2010).

The new law changed the command structure for rescues. According to the new emergency law, DPPA 2010, the National Rescue Command is established under the direct command of the Central Disaster Prevention and Protection Council (DPPA 2010). By doing so, the council was mandated to control and coordinate the centre during rescue operations. Furthermore, the Act stipulates that the Central EOC will be established, reporting to the Central Disasters Prevention and Protection Council (DPPA 2010). In addition, the central government will notify the county government to establish the county emergency response centre in response to an emergency event or

large disasters. Moreover, in order to handle the emergency response efficiently, the DPPA 2010, stipulates that emergency response teams will be established at the central and local levels in order to enhance emergency response measures (DPPA 2010). This makes the entire emergency process efficient compared to DPRA 2000.

The major structural change in rescue coordination centres was reasonable in order to make the emergency system more effective. The following reasons support the argument that the system is more effective as a result of the enactment of DPPA 2010.

Firstly, the National Rescue Command (NRC) is under the direct control of the Central Disaster Prevention and Protection Commission (DPPA 2010). When a natural disasters occurs, the NRC can command, supervise, and coordinate emergency personnel both at the central and county levels, creating more efficient rescue missions (DPPA 2010).

Secondly, the replacement of the three levels of EOCs at the central, regional, and local levels by the new law makes the response to a disaster more efficient. The creation of only two centres, the central emergency centre and the county emergency centre, makes decision making and coordination faster (DPPA 2010).

Thirdly, the activation of the emergency centres as described by DPRA 2000 was required to be initiated from the top of the government by the Cabinet, and it could take days to complete this process (Tsai and Cheryl 2010). This contributed to the rescue operations being ineffective and too slow in responding to a crisis especially within the critical first 72 hours. The DPPA 2010 eliminates such inefficiency by stipulating that the convener of the municipal county is mandated to direct a disaster response centre. This promotes the disaster response and coordination between the local and county governments.

8.3.2.2 Central Disaster Prevention and Protection Organizations and Operations

According to the Taiwanese DPPA Act 2010 Article 6, Chapter 2, the Executive Yuan establishes the central disaster prevention and protection council. The council has the main role in supervising and evaluating the performance of the central and local administration in terms of disaster prevention and protection (DPPA 2010). The council is mandated to carry out any other emergency functions as outlined by the DPPA 2010 Act. Article 7, Chapter 2 of the DPPA Act indicates that the central disaster prevention and protection council will have a single convener and deputy convener. The council is chaired by the Premier and the Vice Premier of the Executive Yuan and the secretary-general, and several commissioners will be assigned on a part-time basis (DPPA 2010).

The Premier of the Executive Yuan shall establish the Disaster Prevention and Protection Expert Consultation Committee and National Science and Technology Centre (Article 7, Chapter 2 of the DPPA 2010 Act). The two will operate under the council and will facilitate the research, development, and implementation of the disaster technology and prevention. The two will also aid in formulating the disaster prevention and protection policies for the Council (DPPA 2010).

Article 7, Chapter 2 of DPPA Act, 2010 stipulates that the Executive Yuan is required to establish the central disaster prevention and protection commission, which is mandated to be chaired by The Deputy Premier. The commission will implement the disaster prevention and protection policy as authorized and mandated by the central disaster prevention and protection council. Article 7 indicates that the central disaster prevention and protection commission will establish the National Rescue Command and the National Disaster Prevention Agency (DPPA 2010). The National Rescue Command will coordinate implementation of the disaster prevention and protection and supervise disaster rescue missions (DPPA 2010). The National Disaster Prevention and Protection Agency (Ministry of Interior) is responsible for handling disaster prevention and protection matters.

8.3.2.3 Local Disaster Prevention and Protection Organizations and Operations

Article 8, Chapter 2 of the DPPA Act 2010, establishes the municipal or county and township (city) disaster prevention and protection at the local level of the government. The main functions as indicated in Article 8 are to sanction the regional disaster prevention and protection plans and rules of the municipality. The municipality will also supervise the emergency response within the municipal/county jurisdiction. The municipality will also undertake any other function as directed by the law (DPPA 2010).

Article 9, Chapter 2 stipulates that in the event of an emergency, there will be one convener and one or two deputy conveners to be chaired and deputized by the administrator and deputy of the municipality. Several commissioners will be allotted on a part-time basis from the military representative, governors, and experts by the municipal mayor or disaster prevention and protection council (DPPA 2010). Article 9 establishes an office of disaster management at the Municipality to deal with the disaster affairs of the Municipality. Also, Article 9 stipulates a consultation committee will be established in the event of a disaster to provide consultation for disaster emergency and protection operations (DPPA 2010).

Article 11, Chapter 2 establishes township disaster prevention and protection organization at the local level (DPPA 2010). There will be one convener and a deputy convener and some commissioners for the township council. According to Article 11, the mayor of the township will be the convener, while the chief secretary of the township shall be the deputy convener (DPPA 2010). The council will also have representatives from the divisions chosen in the regional disaster protection plan.

8.3.2.4 Central and local level Coordination and system operation in the 2010 Act

Article 13 Chapter 2 of the DPPA Act 2010 stipulates that in the event of a natural disaster, the minister of the central regulating authorities shall establish the Central Emergency Operation Centre (DPPA 2010). Based on the nature and influential factors of the disaster, the convener will appoint the central commander. After the establishment of the central EOC, the centre will notify the municipal government to establish the disaster response centre.

Article 4 Chapter 1 establishes the following central regulating authorities depending on the type of natural disaster:

- ❖ Ministry of the Interior to handle disasters like windstorm, earthquake, fire and explosions, flooding, drought, public gas leakage under the ministry of economic affairs
- ❖ Frost, debris flow, forest fire under the Executive Yuan
- ❖ Air Crash under the Ministry of Transportation
- ❖ Toxic Chemicals under the Executive Yuan

The main role of the authorities above according to Article 4 Chapter 1 is to command, supervise, and coordinate the central regulating authorities (DPPA 2010). In case of a disaster, the convener of the municipal or township disaster prevention and protection council, depending on the severity of the disaster will establish a local emergency operation centre. The centre will coordinate with the central emergency operation centre in terms of disaster operations (Article 12, Chapter 2).

8.3.3 Evaluations of the Taiwanese Disaster Prevention Protection Act 2010

The Disaster Prevention and Protection Act of 2010 has two levels of emergency response, the central and the local disaster prevention and protection (DPPA 2010). This means that the emergency systems will be timelier and useful compared to the emergency systems depicted by the DPRA Act of 2000 that had three levels of emergency response (Tsai and Cheryl, 2010). The three levels created unnecessary delays in mobilizing resources and in executing government disaster rescue operations (Tsai and Cheryl 2010). The Taiwanese DPPA 2010 is more useful as it eliminates the bureaucratic procedures depicted by DPRA 2000. Article 12 and 13 of the DPPA 2010 Act establishes central and local emergency operation centres in the event of a natural disaster (DPPA 2010). Back in 2000, Taiwanese government officials at the local level had to communicate, seeking approval from government officials at the top of the hierarchy in case of a disaster (Tsai and Cheryl 2010). The DPPA Act of 2010 stipulates the establishment of local emergency operation centres that will work in coordination with the central government in the execution of rescue operations (DPPA 2010).

The Taiwanese DPPA Act of 2010 is also useful as it empowers the local government by creating regional plans of disaster prevention and protection and rules for the municipality (DPPA 2010, Article 8, and Chapter 2). This makes the local government semi-autonomous in terms of addressing emergency issues. In the DPRA Act of 2000 the implementation of emergency systems required the local government to seek approval from the central government (Tsai and Cheryl 2010). The decentralization in the disaster response brought by the DPPA Act of 2010 is vital because the local government will understand the nature and situations of local emergencies better than the central government.

The DPPA Act of 2010 is also useful in that Article 23 reinforces the need for government officials to conduct disaster monitoring, forecasting, and warning

announcements. It is crucial in disaster preparedness and practice to avert problems depicted by the DPRA emergency systems of 2000, where government departments like the Central Weather Bureau (CWB) gave conflicting information before Typhoon Morakot struck (Tsai and Cheryl 2010). The government department had initially warned of extensive damage and torrential rains in northern Taiwan and low rainfall for the South. The CWB did not know the typhoon would cause rainfall in the south (Tsai and Cheryl 2010). To avert such challenges, the DPPA Act of 2010 addresses data collection, and the appropriate notification of a disaster situation.

Another issue that makes the DPPA Act of 2010 more useful compared to the DPRA act of 2000 is that Article 25 stipulates that government officials will conduct training and drills as part of preparedness and practice. Officials from the two levels of government and public enterprises will implement disaster training and drills for disaster prevention and protection (DPPA 2010). The Act indicates the officials that will be obliged to participate or provide assistance. This addresses the lack of familiarity in the emergency response by government officials during Typhoon Morakot.

Another factor contributing to the usefulness of the DPPA 2010 Act is that Article 23 addresses the communication challenges between the central and local governments. It indicates that to ensure effective communication efficient wireless transmission shall be enacted and publicized by the Ministry of the Interior. The microwave satellite digital broadcast transmission will be installed on a building top at the regional level to enhance stream communication. The Act indicates that the Ministry of the Interior is responsible for compensating the builder accordingly. Stream communication between the central and local levels will boost coordination and the emergency response. This is a great improvement to the DPRA Act of 2000 where information flow between the local and central governments was slow, resulting in a delayed response (Tsai and Cheryl 2010).

8.4 NGOs in Taiwan

8.4.1 Development of NGOs in Taiwan

According to Wang (2012), the development of NGOs in Taiwan can be summarized into the following three stages. The first stage was the germination period that occurred from 1949 to 1987. At this stage, NGOs were under strict government control. The second stage occurred from 1978 to 1996, at this time, Taiwan experienced a political transition from an authoritarian regime to a populist regime, and at this point Grassroots NGOs developed faster. The third and current stage started in 1996 and has continued up until now, at this stage a lack of public goods and services contributed to the more rapid growth rate of NGOs (Wang, 2012).

The social activities of NGOs were limited by the Taiwan Government until the mid-1980s (Juang, 2015). The government was pressured by the fact that it lacked the capacity to improve social security and offer public services (Juang 2015). This loophole during this period gave NGOs a platform to develop and grow in Taiwan. However, the activities of NGOs were far from active given the strong suppression by the Taiwan Government. The development of NGOs in Taiwan can be related to democratization, and the need for social services and the growth of business (Wu, Chiu and Tsai 1997). This information was supported by the interviewees. First, the democratization in the 1990s acted as the turning point, and from then on the activities of NGOs were more noticeable, and their participation was more keenly felt.

The need for social services coupled with the increase of natural disasters in Taiwan have led to the steady growth in the number of NGOs and voluntary organizations in Taiwan (Wu, Chiu and Tsai 1997). And the rise in the national income and the growth of businesses in Taiwan have made entrepreneurs more philanthropic (Wu, Chiu and

Tsai 1997). And enterprises donate vast amounts of funds to establish NGOs to address social services.

8.4.2 The Tzu Chi Foundation and its humanitarian work in Taiwan

There were many local NGOs involved in the response and recovery phase during Typhoon Morakot, such as World Vision and the Red Cross. However, Tzu Chi was the most significant NGO before and after Morakot (Yu 2005; Wu 2007; Ke and Gao 2010).

This research compares the operations of the largest and most significant NGO during the response phase of two cases studies, hence in Taiwan it was Tzu Chi that played a major role in the decision making and operations before and post Morakot. This section provides the background of Tzu Chi and how its responded to the disaster.

8.4.2.1 Brief Background of the Tzu Chi Foundation

The Tzu Chi Foundation is an international NGO that has an international network of volunteers and staff and is bestowed with special consultative status by the UN (O'Neill 2010). The organization was established as a charity NGO with background in Buddhist beliefs and origins by a Buddhist nun Cheng Yen in 1966 (Cheng 2007). She was motivated by the late Master Yin Shun an advocate of humanistic Buddhism who urged her to work for Buddhism. The Tzu Chi Foundation started with a group of thirty housewives who contributed daily to cater for needy families (Cheng 2007). The group grew to a civil society with nearly 10 million members in 47 countries (Tzu Chi Foundation 2014). The core objectives of the organization are based on charity, medicine, education, and humanity (Tzu Chi Foundation 2009). The organization

started with donations, and later extended its areas of operations to medicine, education, and culture (Tzu Chi Foundation 2009).

Tzu Chi has opened several branches in Taiwan with an aim of expanding its network and the efficient delivery of social services. Many other Buddhist NGOs have also been registered in Taiwan showing the significant contribution by Tzu Chi in influencing the decisions of the citizens of Taiwan (Statistical Yearbook of the Interior 2014). There are approximately 38 Buddhist charitable NGOs legally registered with the government. Compared to the other Buddhist charitable NGOs, Tzu Chi is still in first in terms of its development, membership, and number of donors (Statistical Yearbook of Interior 2014).

The Tzu Chi Foundation was among the first NGOs to arrive at the ravaged sites during the crisis management stage of Typhoon Morakot. With the government response being slow and lacking during the first critical 72 hours (Cheng 2013), Tzu Chi assumed a decisive and leading role in mitigating the effect of Typhoon Morakot and minimizing the number of casualties.

Tzu Chi emphasized the primacy of the supply chain process in managing Typhoon Morakot. This is because it is the most expensive part of providing humanitarian aid and determines the success in providing prompt relief and rescue to victims (Abidi and Klumpp 2013). The supply chain activities by Tzu Chi during Typhoon Morakot can be grouped into four major stages: (a) preparedness; (b) resource mobilization; (c) operations planning; and (d) recovery operations.

8.4.2.2 Response to Typhoon Morakot by the Tzu Chi Foundation

i. Preparedness

The first stage of the Tzu Chi humanitarian supply chain during Typhoon Morakot was preparedness. Generally speaking this stage is an ongoing process, involving learning from past disaster management activities while preparing for another disaster. Preparation is a critical stage of any humanitarian supply chain (Anisya 2005), as it provides the basis for conducting the other stages of the humanitarian supply chain. Tzu Chi prepared for Typhoon Morakot in two main ways: (a) Procuring non-perishable relief supplies such as blankets, clothes, and sanitation equipment; and, (b) developing donor networks that were activated when Typhoon Morakot struck. However, many humanitarian organizations usually overlook the preparedness stage because of high staff and volunteer turnover that considerably undermine learning from previous disaster management activities (Cuzzolino 2012).

ii. Resource Mobilization

Based on their definition, when Morakot hit, Tzu Chi started the second stage of the humanitarian supply chain: the mobilisation of resources in terms of manpower, information, and finance. However, Tzu Chi had difficulties in getting reliable information during the pre-crisis stage, which would have been important in preparing the residents of Southern Taiwan for the ensuing devastation. At the onset of Typhoon Morakot, there was conflicting or even misleading information that undermined proper preparation and planning. According to Cheng (2013), the Central Weather Bureau, a government agency responsible for projecting and issuing warnings of adverse weather conditions, issued misleading warnings of adverse weather on the August 6th, The CWB

weather warnings were exactly the opposite of what transpired. Within three days, southern Taiwan had received the equivalent of its average annual rainfall (Wu 2013).

Tzu Chi supply chain stage of resource mobilization began with marshalling human resources. Human resources are critical in any supply chain since they facilitate the rapid movement of goods and services from donors/source to the victims/destination (Walton, Mays and Haselkorn 2011). Tzu Chi used phone calls to reach its branch offices, especially those located in southern and central Taiwan to notify and mobilize its members into action. Tzu Chi also used social media and mass media announcements to reach and request thousands of its volunteers to assemble at designated locations in preparation for initial rescue and relief operations. Within the first 72 hours, Tzu Chi had mobilized more than 15,000 volunteers in the areas worst affected by Typhoon Morakot. Although mobilizing volunteers did not take much effort, Tzu Chi experienced considerable logistical difficulties in moving these volunteers to areas urgently requiring humanitarian aid because these areas were many and geographically scattered over southern Taiwan (Chang, Yang and Chi-duo 2012). In addition, Salvado et al., (2015) contends that Tzu Chi also sent a team to the disaster sites for assessment. Relief supply needs identified within the first 24 hours would have improved the response within the first 72 hours.

Although information plays an important role during disasters, due to the lack of and false information provided by the government agencies, it was a challenge for Tzu Chi to identify the number of victims and the needs of the affected populations (Chang et al. 2012). This proved a challenge to Tzu Chi because information from credible sources such as government agencies and leaders responsible for disaster management was not forthcoming. The DPPA in 2000 not incorporating collaboration between the Government and NGOs also prevented effective communication (Cheng 2013). However, the use of social media and phone calls by Tzu Chi to reach its volunteers and victims and turn them into sources of information was helpful because it provided valuable insights into the extent of the damage caused by Typhoon Morakot. Although

Tzu chi also utilized social media for communication, this proved to be ineffective due to the damage to the infrastructure (electricity). Still, through its volunteers and survivors, Tzu Chi gained insights into the status and numbers of victims affected by Typhoon Morakot, the status of the buildings, and the status of the transport and communication infrastructure, which it used to estimate needs, e.g. food, shelter, and medical supplies. Whybark et al., (2010) contends that, during its initial assessment of the damages, Tzu Chi should have dispatched experts in disciplines such as health, nutrition, and sanitation to provide a rough estimate of the needs of the survivors.

Tzu Chi utilized two approaches to obtain its financial resources (Tzu Chi Foundation 2010). First of all, the organization has a well-established donor network that makes it easy to fund raise. Secondly, internal fundraising is utilized, and hence employees are asked to make donations. On top of that, there are well-wishers who know who they are and who are doing something to donate money. Tzu Chi also requires financial assistance from its employees and volunteers, during Morakot, it raised approximately NT\$5000 to NT\$10,000, within the first 72 hours (Tzu Chi Foundation 2010).

It is argued that Tzu Chi plays a crucial role in humanitarian relief whenever there is a natural disaster in Taiwan. Tzu Chi was among the first NGOs to reach the sites of the affected areas following Typhoon Morakot. The organization has a policy of providing an emergency response and conducting rescue operations within the ‘golden 72 hours’ (Interviewee No. 7 2014). Interviewee No.7 also reported that volunteers were instrumental in saving lives, and they offered free meals to more than 200,000 affected families. They also distributed water, clothes, medical supplies, and other urgent necessities. The Tzu Chi Foundation provided various types of support that included home visits to the affected families, cleaning, and free clinics in response to the Typhoon Morakot disaster.

With its strong mobilisation networks, Tzu chi successfully delivered key humanitarian supplies within three days, including blankets and sanitation materials. In addition its warehouses with prepared supplies also played a key role in the effective delivery. The organisation keeps stocks of non-perishable humanitarian supplies in its warehouses. The organisation also establishes flexible procurement chains, which makes it easier to purchase food and other perishable goods (Interviewee 7 2014). Regarding the delivery routes, the organisation utilised both road and airdrop approaches to deliver humanitarian goods.

Typhoon Morakot damaged the road infrastructure and thus most affected areas were inaccessible. According to Interviewee No.7, the organization trucks were loaded with supplies and then distributed the humanitarian relief aid to areas where the road infrastructure was not damaged. Most of the areas were inaccessible and, therefore, Tzu Chi air dropped humanitarian supplies (Interviewee No.7). The unloading and distribution of the relief materials were done in collaboration with the Taiwan Government.

iii. Operations Planning

In the operations planning stage, Tzu Chi planned and coordinated the distribution relief supplies with other relief activities such as the repair of the road infrastructure and construction of temporary healthcare facilities. According to the Tzu Chi Foundation (2010), in the immediate aftermath of Typhoon Morakot, relief and rescue operations by volunteers attached to Tzu Chi were chaotic and uncoordinated. Most volunteers rushed to the Kaohsiung and Pingtung counties, which were hardest hit by Typhoon Morakot to offer individual and group assistance. A group of 300 volunteers initially assumed they would be able to clear at least two villages but they quickly recognized their work force had no impact at all. The devastation was way beyond their imagination. According to Oloruntoba and Gray (2006), the main problem with the Tzu Chi activities in the

operations planning phase was the lack of coordinated functions with other NGOs or with government agencies, which potentially caused duplication of services and the inefficient distribution of relief supplies. Additionally, no single actor had sufficient resources to respond effectively to a major disaster such as Typhoon Morakot (Bui et al. 2000; Wee et al. 2014).

Tzu Chi procures donations of non-perishable supplies from its network of donors in advance of an actual humanitarian crisis and stocks these supplies in its disaster response warehouses. Advance procurement of relief supplies is an automated process using decentralized stock management software that reconciles stock levels of relief supplies in all its warehouses spread across Taiwan. Stock taking tasks are done bi-monthly and the stock management software flags relief stocks that are below the recommended levels for procurement. Tzu Chi only procures perishable relief supplies such as food in the immediate aftermath of a disaster. However, Tzu Chi faced some difficulties in the procuring of perishable relief supplies and other donations from international donors when the Ministry of Foreign Affairs declined international support during the initial stages of Typhoon Morakot (Cheng 2013).

Once the relief supplies had been dropped to the affected areas, a team of Tzu Chi staff worked with the government to unload and distribute the supplies to the affected and needy people.

iv. Recovery Operations

The impact of Morakot brought a great challenge for reconstruction. Tzu Chi very effectively worked with the government and shared in the decision making and operation process. This enlarged the impact of the organisation, which assisted the government in the tasks of evacuation, response, and reconstruction (Wu 2013). Indeed,

integrating and coordinating the activities of Tzu Chi with those of the Taiwan government was one of the factors that improved the response and recovery activities (Da Costa et al. 2014).

During the post-Typhoon Morakot reconstruction and recovery operations, Tzu Chi collaborated with government agencies to evacuate and resettle displaced families as well as assist them to rebuild their lives. The role of Tzu Chi during the recovery stage was in carrying out the impact assessment.

Tzu Chi advocated the idea of relocating families from the mountainous villages in safer locations. The government accepted and approved the idea. The government identified and acquired land belonging to a sugar company in Shanlin, which it gave to Tzu Chi to take the leading role in constructing shelter to resettle families from the devastated mountain regions. The village was given the name, “Great Love Village”.

Regarding the reconstruction strategy, Tzu Chi advocated a relocation strategy which encouraged the affected population to move away from their home land and build new communities in a safer area (Maa 2010). The government gave approval for Tzu Chi to build the largest reconstruction community in Shanlin (Shea 2010). This community is comprised of three tribes and Han people. Whether or not these people should have been relocated has raised many debates. Most academics do not agree with Tzu Chi, and most of the affected population did not welcome this proposal since most of the affected population were from aboriginal tribes, and did not live like the urbanised and modernised population.

Whereas the concept of resettling families from the devastated and dangerous mountain villages by Tzu Chi was reasonable, the decision was one-sided. Some of the communities such as the Rukai Tribe earmarked for resettlement vehemently

complained about Tzu Chi and the government side siding with them in the decision to resettle them. Rukai Aborigines complained of the requirement to sign an agreement to give up their ancestral lands for permanent housing. They also complained that Tzu Chi failed to consider their culture and livelihoods such as forbidding them from carving totems in their new homes, and including Buddhist slogans and a new set of Ten Commandments in the newly constructed Chapel (Presbyterian Church in Taiwan 2010). Howden (2009) argues that failing to consider the suggestions and demands by victims of a disaster will undermine post-disaster reconstruction activities, whose fundamental objective is to facilitate and support the victims to return to their normal lives within realistic timelines.

At the time of conducting the interview, the organization was actively involved in post-reconstruction activities according to interviewee No.7. The organization worked with the Taiwan Government in constructing permanent houses for the indigenous communities. The management of Tzu Chi determined that “the mountainous villages were damaged beyond repair and were dangerous for human habitation” (Interviewee No. 7). The management of Tzu Chi approached the Government with an idea of rehousing the villagers elsewhere. The idea was approved and the site belonging to the Sugar Company, in Shanlin, on the northern side of Kaohsiung was given to Tzu Chi to implement the idea. According to Interviewee No.7, the Village was given a name “Great Love Village”. At the time of the interview, 600 of the 1500 homes were completed for the survivors of Typhoon Morakot.

Interviewee No.7 indicated “Great Love Village” would also have other social amenities. There will be “four churches, an arts centre where villagers can sell their traditional goods, a medical centre and an office of the local government.” The village is well designed to cater for living, work, and socialization. Interviewee No. 7 said, “Tzu Chi is dedicated to completing the houses so that every displaced villager will feel comfortable living in them, they will be something precious and permanent with donations raised from our members....”

8.4.2.3 Distinguishing Tzu Chi Humanitarian Supplies Chain from Other NGOs

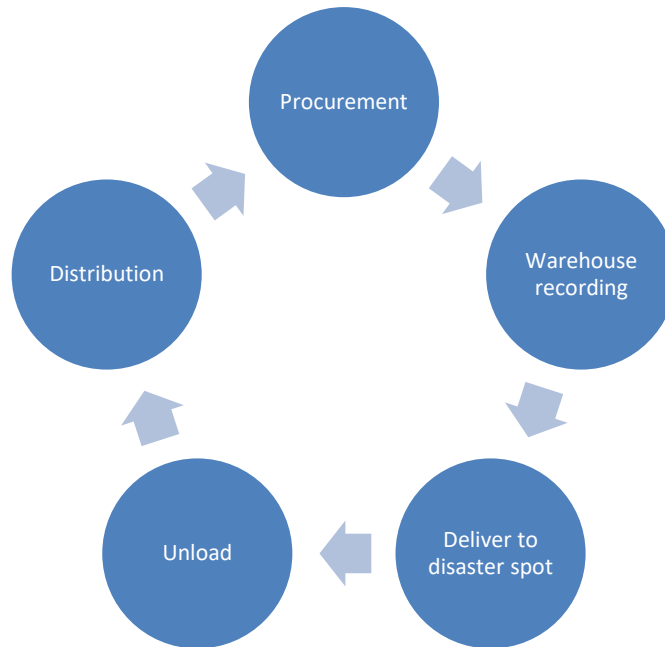


Figure 8.4: Basic humanitarian supply chain

	Government	Tzu Chi
Procurement	Verbal contact	Donation
Warehouse recording	Software	Software
Delivery to disaster Spot	‘Verbal agreement’ company or relevant government department	Member’s company
Unload	Signature required	Signature required
Distribution	By different critical: depends on the crisis	Depends on Leader’s will

Table 8.1: Tzu Chi humanitarian supply chain

Tzu Chi's supply chain for disaster management seems to be effective, but it is debatable whether this is the case for the preparation of the relief goods.

“Tzu Chi has a flexible and the most efficient supply chain to cope with the challenges posed by the logistics and distribution of relief supplies. The demand for supplies is uncertain; however, Tzu Chi procures or gets donations of non-perishable relief supplies before an actual event....”

(Interviewee No. 7 2014)

The pre-event planning by Tzu Chi involves a stock analysis of the relief materials in its warehouses to establish the supplies that need to be procured. According to Interviewee No. 7, the organization has stock software that reconciles the amount of stock in all its warehouses distributed around the country (Interviewee No. 7). Stock takes are conducted twice monthly, and the information is updated to the stock software that is decentralized to all the branches. The software shows the materials that are below stock and which the management is required to procure (Lv 2009). According to Interviewee No. 7, the organization has some prequalified suppliers who must prove their capability before being selected. The relief materials that are purchased and stocked by the organization in the warehouses are common humanitarian relief materials that are non-perishable (Interviewee No. 7). Perishable relief supplies like food are urgently procured after natural disasters have occurred. The organization has a big budget to buy supplies although the interviewee was reluctant to disclose exact figures.

According to Interviewee No.7, before the procured goods are stored in the warehouses the stock software system is updated. Apart from procuring humanitarian supplies, Tzu Chi appeals to its donors for donations of humanitarian supplies (Tzu Chi 2009). According to Interviewee No. 7, the organization prepares a guide list to its donors of the goods and materials that need to be restocked.

When disasters occur, deliveries to the disaster spot are done efficiently (Lin et al., 2004). The organization has a dedicated team of staff that has experience in logistics and coordination. The organization distributes humanitarian materials on a demand basis (Stoddard 2003). According to Interviewee No.7, a team is first dispatched to the disaster areas to make a record of the supplies that are required by the affected people. This list is then sent to the warehouses where the supplies are urgently uploaded to the trucks for distribution to the affected areas. If the affected areas are not accessible by road, the organization management liaises with the government for easier distribution through airdropping (Interviewee No. 7). Once, the supplies are delivered to the affected areas, the government rescue operations are involved in the unloading and distribution to the affected people.

8.4.3 Response to Typhoon Morakot by International NGOs

International NGOs in Taiwan have cooperated with the government in responding to natural disasters. The NGOs participate in relief work and provide supplies that aid in disaster response and recovery. In response to Typhoon Morakot, international NGOs responded in offering humanitarian support in the wake of huge destruction (Cheng 2013).

The Red Cross Society of China also played a crucial role in the response to the Typhoon Morakot disaster (Tsai and Chieh 2014). The organization on behalf of the Fujian branch contributed CNY 1 million to support the relief efforts. The organization, dispatched 1,500 family kits that consisted of hygiene items, towels, spoons, etc. to affected counties such as Xiapu and Tuorong (Tsai and Chieh 2014). Moreover, the organization also allocated water purifiers, cooking oil, and rice and mobilized resources from well-wishers in response to the disaster.

The Taiwan Red Cross was at the forefront of conducting rescue operations (The Red Cross Society of The Republic of China Taiwan 2012). Although the organization mobilised only 1,500 volunteers, compared to the large number of volunteers from Tzu Chi, these volunteers were well trained search and rescue personnel and engaged in the S & R operations. Similar to Tzu chi, the organization also delivered non-food supplies, and participated in post-disaster reconstruction. The organization collaborated with other NGOs in ensuring the effective coordination and dissemination of information to avoid the duplication of relief work (Folger 2013).

Another International organization that participated was Taiwan World Vision. They recruited 1,000 volunteers to conduct relief operations and distribute humanitarian supplies to the affected families (Cheng 2013). The volunteers also assisted in home clean-up as the flood waters regressed. Moreover, Taiwan World Vision also collaborated with other international organizations in the post-reconstruction activities such as rebuilding homes for the indigenous people.

Another international NGO involved in the relief efforts was the Shelter Box Response Teams. The organization contributed to the immediate humanitarian needs, for example sleeping bags, blankets, and food, etc., and the coordination and dissemination of the rescue efforts (Cheng 2013). It also recruited over 1,000 volunteers who supported with the supply and distribution of relief materials to the affected families.

8.4.3.1 Evaluation of the NGO response to Typhoon Morakot

In contrast to the slow and ineffective response by the Taiwan Government, the timeliness in responding to the crisis by the NGOs was remarkable. Immediately after the tragedy struck, Taiwanese NGOs sprang into action providing relief operations and visiting the affected areas to conduct humanitarian relief. The NGOs' response to Typhoon Morakot was swift and achieved the following successes:

- **Faster Response within the Golden 72 Hours**

The Tzu Chi Foundation was among the first Buddhist NGOs to reach the affected areas within the first 72 hours (Ou-Yang and Bo 2009). This was the shortest time, during which the Taiwanese Government had not yet mobilized its rescue efforts.

- **NGOs mobilized funds within the shortest time**

Within the shortest time, NGOs managed to mobilize funds and distribute them to the victims. For example, Tzu Chi distributed NT\$5000 to NT\$10,000 to approximately 12,000 victim households (Ou-Yang and Bo 2009). Other NGOs such as The Red Cross raised donations to the value of approximately NT\$100 million dollars (US\$3 million) by 15th August barely a week after the tragedy (Ou-Yang and Bo 2009). This response was remarkable compared to the Government that failed to launch any international relief support on time. Furthermore, NGOs mobilized Taiwanese citizens to donate, and the response was positive as citizens took this as their responsibility (Ou-Yang and Bo 2009)

- **Supporting the Government in the Post-Reconstruction Efforts**

NGOs both local and international participated in the Typhoon Morakot post-disaster recovery. According to the interviewed informants, NGOs like Tzu Chi constructed 1,500 houses three months post Morakot for the affected victims (Interviewee No. 7 above). This demonstrated that the response by the NGOs was useful in that the homeless victims were not left to desperately seek shelter for themselves. The Tzu Chi Foundation also participated during the tragedy after completing the important cycle of humanitarian assistance.

8.5 Discussion of Possible Recommendations to the Government and NGOs

The previous sections of this chapter have focused on evaluating the response to Typhoon Morakot by the Taiwan Government and NGOs. Based on these findings, this section provides possible recommendations to both the Taiwanese Government and NGOs for future responses to future disasters.

8.5.1 Recommendations for the Government Disaster Preparedness

To respond to the issue of a lack of preparedness and planning to handle a large scale disaster (Cheng 2013) it is recommended that the government deliver disaster preparedness education and training to decision makers. This disaster preparedness training should be carried out periodically in order to sharpen skills in terms of response and evacuation operations (Perry and Michael 2003). In addition, disaster preparedness training could be introduced into the education curriculum targeting the school-age generation. Moreover, the Taiwanese government could provide disaster preparedness training to villagers through forums. This will increase the understanding of disaster risk and allow the government officials and citizens learn more about emergency response measures.

- **Provision of Convenient Emergency Shelters**

Typhoon Morakot rendered many victims homeless due to landslides and flooding that led to houses been swept away, and others were buried, as was the case with Xiaolin Village (Tsai and Cheryl 2010). In response to such disasters that cause heavy rainfall and disastrous damage, it is wise for the Taiwanese Government to provide convenient emergency shelters. The locations of these emergency shelters should be conveniently placed avoiding places that are inaccessible by road or areas that are close to disaster prone areas like mountains (Tsai and Cheryl 2010). In addition, the shelters should have

sufficient space in order to accommodate vast numbers of individuals and families (Cecchine 2001). Furthermore, emergency shelters should be equipped with life support equipment, medical supplies and communications equipment to facilitate the flow of information. Government officials should manage the emergency centres during disasters (Cecchine 2001).

- **Community Disaster early warning systems**

The Taiwanese Government failed to evacuate village residents despite the constant warnings signs and alerts communicated by the central weather bureau (Tsai and Cheryl 2010). To counter this problem, the government needs to adopt an informal coordination mechanism that channels early warning signs to the villagers. This can be achieved by adopting community disaster early warning systems where village leaders can liaise with departments like the central weather bureau (Hay and John 2009). Such village leaders will obtain real time information about possible disasters like Typhoon Morakot, and such updates can be channelled to the villagers. This will facilitate early evacuations and avoid unnecessary deaths as seen with Typhoon Morakot. The village leaders will disseminate timely information, enabling communities endangered by the hazard to evacuate quickly.

- **Settlement and Afforestation Policies**

Mudslides caused by Typhoon Morakot greatly affected villages like Xiaolin that was entirely buried. The village was located near a mountain and the Nanzixian River (Tsai and Cheryl 2010). The Taiwanese Government propose settlement policies limiting citizens from residing in disaster prone areas such as near mountains or rivers. This would reduce situations where an entire village is buried, and the number of casualties would be reduced significantly. Furthermore, the government should have policies encouraging the plantation of trees surrounding the villages that are prone to disasters.

Trees help in the prevention of landslides as the roots hold and reduce the speed of water running down slopes (Chomchalow 2003).

- **Establish NGO Alliances and Partnerships**

As a result of the lessons from the Ji ji earthquake, NGOs understand the importance of coordination and communication, although it took them some time to build a shared online platform to exchange information and make decisions (Yang and Zhi 2009). However, Tzu chi had not participated in this network. It is advised that a shared network such as this could continue to play a role in coordination and information sharing during normal and disaster events (Rovegno 2002). Such alliances have a significant impact on combining knowledge, technology, resources, and experience in executing a disaster response. In addition, collective partnerships and alliances eliminate the duplications of rescue efforts as NGOs in the alliances share responsibilities and roles.

- **Formulate a criterion to examine and hire volunteers**

NGOs conduct relief efforts through volunteers who in most cases are mobilized when disasters occur, and they are briefly trained to assist with rescue operations (Hui 2013). Such volunteers in most cases do not provide professional services, as they are not trained in rescue operations. In order to conduct more advanced rescue operations, it is important for Taiwanese NGOs to establish a criterion where the volunteers are mobilized, evaluated, and trained way before the occurrence of natural disasters takes place (Moore et al. 2009). This contributes to convenience and disaster preparedness in terms of executing an efficient response to natural disasters like Typhoon Morakot.

8.6 Conclusion

Typhoon Morakot resulted in severe damage to Taiwan, and it will not vanish quickly in the memories of Taiwanese citizens and the world as a whole. Comparing the response demonstrated by the NGOs and the Government, there is no doubt that the NGOs demonstrated more efficiency and speed. The tragedy, however, acted as a wake-up call to the Government that apologized to its citizens and promised more efficiency in any future disaster response. The move to replace the dysfunctional emergency laws (the DPRA Act 2000) with the DPPA Act 2010 is a notable move by the government in the right direction. It is upon the Taiwanese Government to prove its commitment to fulfilling its promises of protecting its citizens against natural disasters.

Chapter 9 Comparative analysis: Wenchuan Earthquake vs. Typhoon Morakot

9.1. Comparison between Disaster Emergency Plans

Table 9.1 Differences of emergency plan between China and Taiwan

Government	China	Taiwan
Classification of scale of emergency	<ol style="list-style-type: none"> 1. Casualties 2. Disaster scale 3. <i>GDP loss</i> 	<ol style="list-style-type: none"> 1. Casualties 2. Disaster scale
Content of Emergency Plan	General	Detailed

A significant difference between the two case studies is their mode of emergency classification. For example Figure 1 on page 98 shows that the Chinese National Emergency Management Plan states that disasters are classified according to the number deaths and the impact on the country's economy. The reason for this categorisation is that it allows the rescue efforts to focus their resources and align them with the level of severity. On the other hand, the example of Taiwan's Emergency Management Plan gives no clear indication about whether the response efforts should be affected by the economic impact of a disaster (The Office of Disaster Management (ODM), Taiwan 2010). Another example is seen in Figure 7 in page 103 where the Chinese Emergency Response Plan classifies emergencies as general, large, significant, or major (Li et al. 2014; The National Emergency Plan 2012). Figure 7 further shows that a disaster emergency is classified according to its degree, its number of casualties,

and the impact on the state's economy. In the Taiwanese case study, the DPPA classifies a disaster according to the type of disaster and the type of response by different departments (Vitoriano, Montero & Ruan 2013). However, other than this vague classification in the Taiwanese response plan, there is no indication that the plan considers the death toll or the economic impact of a disaster. These examples clearly show that the Chinese system could be seen as more efficient and practical than the Taiwanese system.

According to China's Emergency Response Plan an earthquake that falls into the major category is one that causes less than 300 deaths and missing persons, while large earthquakes are those that lead to more than 10 deaths and less than 50 severe economic losses (Bissell, Pinet, Nelson & Levy 2004). A general earthquake is one that leads to a total of 10 deaths and missing persons. The Emergency Response Plan further stipulates that while large and major earthquakes cause severe economic losses, significant earthquakes are those that cause a loss of less than 1% of the GDP (The Disaster Mitigation Centre of the Ministry of Civil Affairs 2008). The reason for this classification is to make disaster preparedness and planning easier since different degrees of earthquake will require different responses.

- **Content of an Emergency Plan**

The contents of emergency plans further differ in terms of their objectives and details. For example while the Chinese emergency response plan outlined three components to achieving its main goal, its Taiwanese counterpart describes four main objectives (Li et al. 2014; Lin 2008). The main goal of the Chinese plan is to assist decision making, protect aid workers, and finally provide guidance to the rescue workers (Canton 2007). Conversely, the main objective of the Taiwanese Plan is to have the government actively advance its systems for managing disasters (BBC News 2009). The first response level in the Chinese Plan incorporates the use of risk valuation, describes the

arrangements at the institutional level, includes early warning observation, and describes the remediation measures to prepare for natural disasters (Li et al. 2014). The second component of the Chinese Emergency Response Plan involves the responses of the field aid teams, the rescue efforts that involve the active participation of the entire society and the military, and disaster alleviation (Li et al. 2014; The National Emergency Plan 2012). Lastly, the plan stipulates the recovery and rebuilding efforts by providing the action plans before, during, and after a disaster with careful consideration of the factors that influence the process (Vitoriano, Montero & Ruan 2013). However, the Taiwanese plan is briefer in its description of the actions that should follow an emergency. The plan indicates that disaster alleviation should be the main goal. After alleviation, preparedness should follow, and then response and finally recovery. The two emergency plans include the response phases which provide guidance for disaster mitigation (Vitoriano, Montero & Ruan 2013).

The content of their emergency plans also differ significantly. For example while the Chinese plan is rather general and has fewer pages, the Taiwanese plan is more detailed. This difference is seen in the classification of disasters since the latter classifies emergencies according to the different types of disaster and the type of response by different departments. However, when an actual disaster occurs, the Chinese response system is more involved than its Taiwanese counterpart (Li et al 2014). Although the Taiwanese response plan explicitly details the system of response, during emergencies the responsible parties tend play the blame game, as no one is willing to take responsibility (Lin 2008).

The revision of the plans was another important point of comparison. While the Taiwanese Emergency Response Plan had been revised through the promulgation of the Disaster Prevention and Prevention (DPP) Act in 2010, the Chinese Plan has had no such revisions. The revision of the DPR (2000) was in response to the impacts of previous devastating natural disasters and signified an impressive improvement in the management of disasters and the formalisation of the Taiwanese government's disaster

management system. The presence of a revised version of DPRA (2000) was a result of the identified shortcomings in the original version.

Another difference in the two emergency plans is the involvement of the government in emergencies. The Chinese government selects the disaster response team and directs all efforts to support the activities of such a team (Vitoriano, Montero & Ruan 2013). This involvement of the government makes the Chinese disaster response more efficient than Taiwan's. For example in the aftermath of the Wenchuan earthquake, the Chinese state council was in charge of the response efforts (Bo & Walle 2010; Bissell et al. 2004). The Chinese emergency plan dictates that the state council is only responsible for providing aid when there is a significant earthquake (Bissell et al. 2004). The provincial and city headquarters deal with major and large earthquakes respectively, while the state council ensures there is coordination and supports the efforts of both headquarters. The disaster relief headquarters at the city level is in charge of large earthquakes. The city headquarters enjoy the support of the provincial headquarters while the country's earthquake administration supports the relief work. The county headquarters for disaster relief in turn take care of emergencies resulting from general earthquakes (fig. 1). The headquarters at the provincial level as well as at the city level, and the state's earthquake administration and other state departments assist the county with the disaster relief.

9.2 Comparison between the local government responses during disasters

Table 9.2: Local government response during disasters

Government	China	Taiwan
Local government response during disaster	<ol style="list-style-type: none"> 1. <i>Send Chinese armed force to carry out rescue task;</i> 2. Establish Disaster Relief Headquarters; 3. Mobilize resources; 4. Repair infrastructure; 5. Evacuate victims and provide shelter; Security patrol;	<ol style="list-style-type: none"> 1. Establish Disaster Relief Headquarters; 2. Mobilize resources; 3. Repair infrastructure; Evacuate victims and provide shelter;

It is also necessary to make a comparison between the levels of involvement by other national agencies. For example, while the Chinese government involved its police force and other agencies, its Taiwanese counterpart utilized its armed forces and military under the direct of the President. However, the Taiwanese plan also included the use of technology to aid in the management and reduction of disasters. In relying on lower levels of administration to provide information on disaster management, the Taiwanese emergency plan was more efficient than the Chinese plan (Kuhlicke 2013). The Chinese state council worked in close collaboration with the local governments in the affected regions to facilitate relief and recovery. This difference between the two is the policies that are in place in each country and the rules that are set for the individual emergency plans.

The second factor for comparison in the local government response during disasters is the establishment of disaster relief headquarters. For example, the Chinese government established headquarters at the State Council, the city relief centres, at the county level, and the provincial level (Chen 2009; Chen & Booth 2011; Xu et al 2009; National

Emergency Plan 2012). Figure 1 on page 43 shows that Taiwan also established headquarters at the central, regional, and local levels (Tsai and Cheryl 2010). The establishment of these headquarters was meant to devolve the responsibilities for the disaster response and thus reduce over-reliance on the central government.

The third point of comparison in the local government response system is the mobilisation of resources. For example in the aftermath of the Wenchuan earthquake, the Chinese government mobilised resources in the form of donations, the army, rescuers and fire fighters (Tsai & Chen 2010). The Chinese and Taiwanese governments also mobilised humanitarian aid resources after the disasters (Boon 2012). In contrast, the Taiwanese local government acted by mobilising the armed forces and rescuers to deliver relief aid and funds to the affected areas. The role of resource mobilisation often falls on the government since the state is capable of funding disaster relief.

Another difference in the local governments' responses is in terms of their reconstruction efforts. For example after the Morakot typhoon, the government worked with Tzu Chi Foundation to carry out post-reconstruction activities (BBC News 2009; Chang et al. 2012). These activities included the construction of permanent houses for Taiwanese communities and the rehousing of the people living in the mountainous villages. Similarly, the Taiwan Red Cross and Taiwan World Vision also undertook reconstruction by rebuilding homes (Alexander & Davis 2012; Canton 2007). On the other hand, China has a disaster recovery and rebuilding plan which outlines the actions to be taken before, during, and after a disaster (Benedikter & Nowotny 2013; Bo & Walle 2010; China 2009). There is also an important comparison point in terms of the local governments' evacuation efforts. For example the Taiwanese government mobilised 182,000 military soldiers to evacuate thousands of victims (Chang et al. 2012; Cheng 2013). The Chinese government conducted evacuations through the local government which reports to the national headquarters (Zhang, Rezaee & Zhu 2010). The Chinese local government used security personnel to safely deliver humanitarian aid and evacuate the victims. And given that the road to recovery after a disaster begins

with the reconstruction and rebuilding of homes and infrastructure (Cozzolino 2012), the governments' efforts at reconstructing infrastructure, rebuilding homes, and resettling the victims all served to aid recovery.

9.3 Comparison of NGOs activities and the NGO registration process

Table 9.3 NGOs difference between China and Taiwan

NGOs	China	Taiwan
Registration process	Difficult <i>(dual management system)</i>	Easy
NGOs' situation (do they have a common standard; have they effectively been monitored or supervised, and so on)	1. Organization quality is uneven 2. Too many grass root (unregistered) NGOs 3. No unified regulatory oversight system	Considerably better because of the regulatory oversight system
Funder	Government	Master Shi Zhengyan (She is a nun)
Recruitment	Government staff and volunteers	Volunteers
Source of funds	1. Government grants 2. Public donations	Public donations <i>Member's donations</i> <i>Recycling</i>
Political affiliation	Communism	Buddhism

Firstly, in the comparison between the activities of the NGOs during the two disasters, China used the Chinese Red Cross, and Taiwan used the Tzu Chi Foundation. Secondly, the process of registering NGOs is easier in Taiwan than in China. This process was difficult in China's case because the country's management system is dual in nature, making it hard to register NGOs with the relevant government department (Bissell et al. 2004; Kovács 2012; Zhang, Yi & Zhao 2013). On the other hand, the Taiwanese management system is less strict and the process of registering NGOs is much easier. According to Boon (2012), NGOs are instrumental in delivering humanitarian aid during disasters.

There is a significant difference in the standards of the humanitarian supply chain in the two countries. For instance, China has a pronounced unevenness in determining the quality of organisations (Boon 2012; Cozzolino 2012; Li, Chen, Lee & Rao 2013). Secondly, there are too many unregistered grass root NGOs in China (Bissell et al. 2004; Zhao 2012). Thus, unlike China with its less unified regulatory system, Taiwan has an impressive regulatory oversight system.

There is a significant difference in the manner in which NGOs are funded in the two countries. In the case of China, the Chinese government funds the NGOs in China while a nun by the name Zhengyan Shi who was the founder of the Tzu Chi Foundation in Taiwan (Tzu Chi 2009).

The difference in the type of recruitment is also a crucial point of comparison. For instance the Chinese government recruited their employees and volunteers into the relief effort (Bissell et al. 2004). In contrast, Taiwan mainly enlisted volunteers in the rescue effort when the Morakot typhoon hit.

Another important contrast between the two countries is their political systems. China is a communistic society, while Taiwan places high value on religion especially Buddhism. Secondly there is a difference in the sources of funds used in providing humanitarian aid. Whereas both countries obtain donations from the public, the Chinese government additionally funded relief efforts (Boon 2012). In Taiwan's case, funding came from the donations from members of the Tzu Chi Foundation and recycling of the available resources (Wang et al. 2012).

9.4 Comparison between the NGOs Humanitarian Supply Chain Systems

Table 9.4 compare humanitarian supply chain between China Red Cross and Tzu Chi

NGOs' Humanitarian supply chain	China Red Cross	Taiwan Tzu Chi
Procurement	<ul style="list-style-type: none"> • Donations • Urgent procurement 	Donations
Warehouse recording	Software	Software
Delivery to disaster Spots	<ul style="list-style-type: none"> • Subordinate units • Government departments 	Member's company
Unloading of supplies	Signature required	Signature required
Distribution	Needs to be signed for and allocated according to the category group	<i>Depends on Leader's will</i>

The first point of comparison is the differences in the local humanitarian supply procurement. For example, in response to the Morakot Typhoon, the Taiwanese humanitarian aid materials were either bought in advance or acquired from donations

from the public (Interviewer No. 7 on page 64). On the other hand, following the Wenchuan earthquake the China Red Cross appealed to local and international well-wishers to provide relief (Boon 2012). Additionally, the China Red Cross urgently bought supplies to meet the needs of the victims. However, the earthquake affected many people over a wide area (Boon 2012). The pressure to deliver relief aid made it necessary for the Chinese government to purchase supplies indiscriminately and these supplies did not meet the needs of diverse groups of people who were victims (Cuzzolino 2012).

The second point of comparison is the methods used to record the humanitarian aid stock in the warehouses (Li et al. 2013). The research here shows that the warehouses belonging to the Tzu Chi Foundation in Taiwan had stock software for recording the level of humanitarian aid stock (Tzu Chi 2009). This software merges the amount of stock in all their warehouses (Interviewee No.7). Similarly, the China Red Cross also used stock software to document its humanitarian stock.

The differences between the delivery system is an important comparison point. While the China Red Cross used subordinates to deliver the humanitarian materials with large vehicles (Boon 2012; Wang et al. 2012); In contrast, Tzu Chi delivered humanitarian supplies through a well-developed international shipping company owned by one of Tzu Chi's members (Interviewee No. 9). It is a huge advantage for NGOs to have free support in a crucial operation chain.

Another comparison point is in the unloading and distribution of humanitarian aid supplies in emergency regions. In the cases of both disasters the rescue workers had to sign to unload the relief products released to them during the Wenchuan earthquake and the Morakot typhoon (Boon 2012; Hung & Chen 2013). The distribution of humanitarian aid supplies in the emergency region is also a point of comparison (Li et al.

2013). In both Wenchuan and Morakot the rescue workers had to sign a distribution form for the relief products to be released to them.

Chapter 10 Recommendations

In order to improve and enhance the effectiveness of the humanitarian relief work by NGOs under the emergency plans of China and Taiwan, this author proposes the following points.

10.1 Inclusion of an Activity Guide for NGOs in the Emergency Plans

An NGO activity guide is crucial since it serves to direct a disaster response (Vitoriano, Montero & Ruan 2013). The inclusion of such a guide in an emergency plan would allow the Taiwanese and Chinese governments to collaboratively mitigate the effects of disasters (Tsai & Cheryl 2010). The Asian Pacific region is prone to natural disasters which have led to the increased demand for social services (Brenner, Bush & Moses 2010; Parsons et al. 2015). Brenner, Bush and Moses (2010) further explain that NGOs are better equipped to meet the need for social services, and the inclusion of an NGO activity guide in the national emergency plans would allow the governments to mitigate the effects of natural disasters with ease. Cozzolino (2012) explains that a government is responsible for funding and overseeing disaster rescue efforts as well as providing humanitarian aid in case of an emergency. On the other hand NGOs can provide crucial relief and social services especially during a disaster (Brenner, Bush & Moses 2010; Li et al. 2013). Since the government cannot singly carry out rescue efforts and provide humanitarian aid, stable cooperation between the government and NGOs as well as other private companies allows the efficient execution of humanitarian aid (Cozzolino 2012; Martin, Weerasinghe & Taylor 2014). This need raises the question of whether the inclusion of the role of NGOs during disasters is necessary (Parsons et al 2015).

Currently, strict government policies and regulations hamper the registration and functionality of NGOs particularly in China (Edele 2009). For example the Chinese Emergency response plan contains strict laws that govern NGO registration with the Civil Affairs Ministry (Li et al. 2014; The National Emergency Plan 2012). The findings on page 24 show that Chinese NGOs are required to obtain government sponsorships to qualify for subsidies. Instead, it would be better for the Chinese government to recognise the social role of NGOs during disasters and relax its tough regulations and policies to include provide roles for NGOs during emergencies (Brenner, Bush & Moses 2010).

Secondly, emergency plans should indicate the need for alliances and partnerships among local NGOs (Ashley & He 2008). Such an inclusion would obligate NGOs to perform certain roles that the government does not have time or the capacity to perform. The implementation of a disaster response on an individual organisational level is often inefficient and restrictive (Tsai & Chen 2010). As seen in the case of China's emergency response during Wenchuan, the local NGOs cooperated in the provision of humanitarian aid (Edele 2009; Li et al. 2013). This cooperation evidently led to better services (Cozzolino 2012). On the other hand, the NGOs that responded to Morakot did not work together which led to a less efficient disaster response (Hung & Chen 2013). Instead, the NGOs responded as single entities that slowed down rescue efforts and led to the duplication of activities. Alliances among NGOs often result in the combination of the information, technology, experiences and resources that are needed in the execution of a disaster response (Ashley & He 2008). Such partnerships also prevent the duplication of rescue efforts as there is efficient information sharing describing the roles of each organisation. Therefore, if the Chinese National Emergency Response and the Disaster Prevention and Protection act (2010) includes an activity guide for partnerships between NGOs, these would be easier to implement and would in turn improve an emergency response (Edele 2009; Li et al. 2014).

A comparison between the NGOs' and governments' responses shows that NGOs are more efficient and swift in their responses. The integration of the efforts by NGOs in the disaster management plans in Taiwan and China would greatly enhance the efforts when dealing with disasters in the future (Kuhlicke 2013; Lin 2008). These organizations work within the community and can explicitly determine the needs of the communities (Glyn, Stoddard, Harmer, Haver, & Harvey 2012). NGOs can often promote better organisation at the community level during disasters, and such cooperation results in a faster and more effective response. Additionally, NGOs are autonomous organisations which mean they can coordinate their disaster preparedness and planning in the absence of bureaucratic challenges (Parsons et al. 2015; Vitoriano, Montero & Ruan 2013). For example the chain of command and the unclear channels of communication indicated in DPPA (2000) led to the inefficient response during the Morakot typhoon (Buck, Trainor & Aguirre 2006). This shortcoming can be mitigated by collaborative efforts between NGOs and the government, where such collaborations will ensure that the collection and dissemination of information is efficient (Tsai and Chen 2010).

The Chinese and Taiwanese Emergency Response Plans stipulate the hierarchical disaster response levels needed in order to coordinate their efforts when dealing with disasters. However, the orders of authority in both cases are ambiguous which resulted in delays (Xing & Haibo 2010). Had the NGOs been included in these emergency plans, they would have played an essential role, since their organisational structures were much simpler than the government's (Edele 2009). For example soon after the Morakot typhoon struck, the NGOs in Taiwan were quick to respond (Hung & Chen 2013; Lin 2008). According to Tzu Chi (2009), the foundation sent rescuers to the affected areas to deliver humanitarian aid. This response was swift and this efficiency led to better outcomes than those achieved by the Taiwanese government (Martin, Weerasinghe & Taylor 2014).

International NGOs have a higher capacity of dealing with rescue and humanitarian aid regardless of the magnitude of a disaster (Cozzolino 2012; Li et al. 2013). On the contrary, the capacity of governments to provide relief aid during high magnitude disasters remains limited (Martin, Weerasinghe & Taylor 2014). For example the Tzu Chi Foundation has an international network of employees and volunteers (Tzu Chi 2009), with a membership of over 10 million people in 47 countries. During the Morakot typhoon, the foundation mobilised 15,000 volunteers to aid in the rescue efforts (Glyn et al. 2012; Hung & Chen 2013). Additionally, the foundation has UN consultants within its ranks which make it better equipped to handle high magnitude disasters. It thus goes without saying that by including an activity guideline for Tzu Chi in DPPA (2010), the Taiwanese government would be better placed in its preparation for disasters and thus could provide the much needed humanitarian aid (Tzu Chi 2009).

When emergency response plans include an NGO activity guideline, it would then be easy to mobilise and distribute the funds needed by the victims (Glyn et al. 2012). Evidence shows that when it comes to raising funds for humanitarian purposes, NGOs attract more donors than governments. Cozzolino (2012) explains that the involvement of NGOs through the documentation of their expected roles would boost the quality of humanitarian aid and result in better outcomes including recovery and reconstruction. Moreover, the presence of an NGO activity guide in the emergency plans would encourage alliances among NGOs (Ashley & He 2008). Such collaborations would improve the efficiency of the humanitarian aid (Li et al. 2013). For example if the Tzu Chi Foundation, Red Cross and World Vision, and the Taiwanese conducted humanitarian work collaboratively, then a disaster response would be faster (Martin, Weerasinghe & Taylor 2014). Such alliances would facilitate information sharing to further boost the coordination of the activities leading to better outcomes (Ashley & He 2008). A clear guide on the activity of NGOs would also minimise the duplication of efforts during a disaster. Evidently, the documentation of the roles to be played by each partner would clearly direct their efforts and actions. Such clarity would reduce incidents of conflict and speed up rescue efforts and humanitarian aid (Li et al 2013).

10.1.1 Contents of the NGO Activity Guide

An NGO activity guide should contain sufficient details to guide the rescue and humanitarian work (Cozzolino 2012). The different components that should be incorporated into an NGO activity guide are described below.

- **Set this guide as an agenda**

The first element in such a guide should be the agenda of NGO operations during a disaster. According to Kuhlicke (2013), an agenda identifies the needs and expectations of the authorities and the public and victims from disaster management. The agenda would provide a general statement of the purpose of NGOs' and would allow the government to rank its disaster response priorities. For example such an activity guide would stipulate that the NGO should first save lives and then conduct its reconstruction and rebuilding efforts.

- **Objective of activity guide**

Secondly, the activity guide should indicate the disaster management objectives (Edele 2009). These objectives would guide all the efforts when responding to disasters. These management objectives would be expressed through the purpose, the list of expected disasters, and the response priorities (Lei, Zhou & Yin 2014). The activity guide objectives should also clearly indicate the expectations in terms of the NGO performance, which should reflect the country's culture and its political mandate. The inclusion of objective statements in the Chinese and Taiwanese emergency plans would guide the development of strategies and ideas to tackle different types of disaster at different levels (Glyn et al. 2012). One such objective is to ensure that there are measures in place to enhance disaster preparedness (Edele 2009). Thus the DPPA (2010)

and China's emergency management plans should also include the steps necessary for ensuring disaster preparedness. It is important to estimate the magnitude of each natural disaster to get an approximation for the number of lives at risk. The NGO guide should indicate the expected injuries by their level of severity, damages and economic loss. These estimates would allow the emergency plans to indicate the level of NGO involvement according to the magnitude of each disaster.

- **Add indication the level of collaboration**

The NGO activity guide in the emergency plans should also indicate the level of collaboration between the government and NGOs and among the different NGOs. Such details would serve to ensure that there is a high level of coordination and in turn the rescue efforts are efficient. The main challenge with the two emergency plans during the Morakot and Wenchuan was that there were significant delays in the delivery of the humanitarian aid (Glyn et al. 2012; Hung & Chen 2013). These delays were as a result of disorganised emergency systems at the state and local levels. As noted by Buck, Trainor and Aguirre (2006) emergency plans should indicate the chain of command, such that what is expected is clear to all the rescue parties. The inclusion of this guide would ascribe specific roles to each partner (Eriksen 2003). A clear description of each player's role during disasters would ensure that the level of efficiency is higher (Tseng & Chen 2012). This guide should clearly state the expected actions from the NGOs and from the government during different types of disasters.

- **Gather the information of each NGOs main activity area**

This activity guideline shall also contain details of the major area of involvement of the NGOs during the process of disaster management (Kuhlicke 2013). Thus, it should contain details on formal consultation, ideas on strategic collaboration to deliver interventions, and resource mobilisation. This guide should clearly define the extent of

NGO involvement during each phase of disaster management together with the roles of these NGOs (Glyn et al. 2012; Lei, Yue, Zhou & Yin 2014). The guide shall indicate that NGOs shall be involved in the establishment of effective systems to analyse risks. The emergency plans should indicate that NGOs are also responsible for providing early warning systems that would lead to prompt action against anticipated disasters (Chou & Chen 2012). The guidelines will indicate the specific activities that NGOs will facilitate such as the gathering and maintenance of supplies, planning for contingencies, coordination with other agencies, evacuations, as well as the creation of public awareness (Tseng & Chen 2012).

- **Include the community based NGOs**

The NGO activity guide should include the role of the representatives of community based voluntary organisations. These organisations are involved in planning for disasters and a guide that involves them would provide greater insight into the capacity and commitment of communities. The identification of the community profile would guide the activities of the NGOs. The activity guide should also indicate the involvement of the NGOs in the assessment of risk and the management of knowledge (Blaikie et al. 2014; Chou & Wu 2014). Stipulated advocacy initiatives can set the precedence for formulating good policies to enhance disaster preparedness. The barriers that exist in the current plans can be amended and the opinions of NGO members taken into account. Creating a mutually beneficial relationship with the government through information sharing shall ensure a comprehensive outlook towards a disaster (Chou & Chen 2013). The coordination platforms should be based on the central and local levels which will ensure good coverage of the geographical area (Chu, Tsai and Liu 2015). Central level administrative levels of NGOs will work with the national government while the local level will operate at the grassroots, community jurisdictions. Activities may include local communities being supported by local governments to develop procedures for operating in disasters. NGOs shall then create awareness of the standard

operating procedures and facilitate the transfer of knowledge from the households within the local community to the state (Tseng and Chen 2012).

Communication plays a significant role in the coordination and delivery of humanitarian aid. Therefore, the activity guide shall indicate the most efficient communication channel to this end. Currently, governments and NGOs act alone, especially in Taiwan (Lin 2008). Thus an NGO guideline that stipulates the chain of command in emergency plans would outline the manner in which communication would be relayed (Buck, Trainor & Aguirre 2006). Disaster mitigation activities shall be included in the NGO activity guide in the emergency plans. These activities are meant to reduce the effect of disasters and they include the analysis and reduction of risk. The inclusion of disaster mitigation has gained popularity as a major facet of the management of disasters (Lei, Yue, Zhou & Yin 2014). NGOs play a crucial role in reducing the impact of disasters (Hsiung et al. 2010). As such emergency plans can include mitigation initiatives and the objectives of these initiatives. The guide should indicate construction improvements, environmental control, etc., as the activities that NGOs and the government will engage in to mitigate a disaster (Alexander and Davis 2012).

- **Flexible policies**

The NGO activities advocated for should include the implementation of good policies through NGOs. These policies and the collaboration between the governments and NGOs shall result in more resilient emergency response systems (Hsu et al. 2013; McDaniels et al. 2015). Documentation by the government describing the issues related to a disaster can be wholly comprehended and achieved through the use of data collected from NGOs. The NGOs shall collect information regarding disastrous events, thereby acting as a tool for monitoring and evaluation, and in addition, provide evaluation of vulnerable communities in need of social protection and create awareness through advocacy efforts (Blaikie et al. 2014). This information is essential for

government agencies in improving the helping process in addition to learning from disasters (Glyn et al. 2012).

The details of the steps to be taken to prevent the escalation of disasters shall be included in the activity guides. These shall include the process of controlling the devastating effects of disasters, the restoration of order after a disaster, recovery, rehabilitation, and reconstruction (Alexander 2014). Activities aimed at disaster response shall allow the NGO-government partnerships to mitigate its effects (Hung & Chen 2013). The activities to be undertaken as a response to a disaster are meant to minimise the loss of human life and suffering. This process requires a lot of coordination and cooperation (Hung & Chen 2013). NGOs play a central role in the process through strategic partnerships with local and national government agencies.

10.1.2 Categorisation of the NGOs' Activity Guides

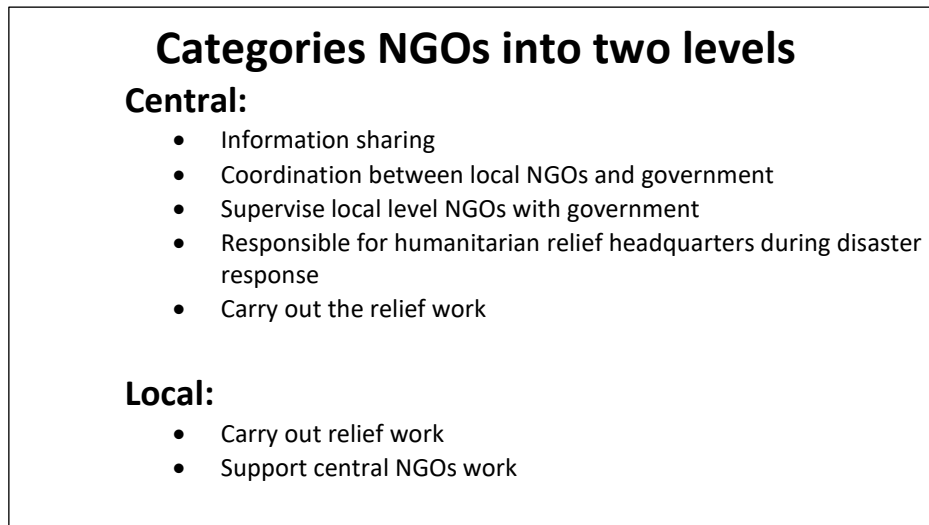


Figure 10.1: Summarized recommendations

The restructuring of the disaster management in both China and Taiwan to incorporate NGOs would improve disaster preparedness and planning in each country and this would result in a more efficient emergency response (Kuhlicke 2013). The findings here show that China is heavily cautious about working with international NGOs (Edele 2009), and because of this aversion, the establishment of a cooperation structure between NGOs and the government would require the inclusion of NGOs in the emergency response plans. Although the Taiwanese government shows greater commitment to working with NGOs than its Chinese counterpart, there is no clear guidelines for this partnership (Tsai & Cheryl 2010). NGO activities can be classified at the central and local levels (Li et al. 2014), each of which are considered below.

10.1.2.1 Central Level

The central level involves NGOs that operate on a large scale and that have huge financial requirements. NGOs at this level would have presence throughout the country.

Centre level NGOs would best correspond to the disaster mitigation initiatives at the state level. The revised Chinese National Emergency plan should thus indicate that for NGOs to be categorised as at the central level, they should have a membership of at least 300,000 people. The Taiwanese emergency response plan should indicate that for NGOs to be considered as at the central level, they should have at least 50,000 members.

The Taiwanese NGOs at the central level will be required to establish strategic partnerships with the Yuan administrative systems which include the executive, the control, judicial, and legislative departments (Tseng & Chen 2012). Although the administrative system in China is better structured than that of Taiwan, it lacks the coordination with NGOs (The Control Yuan Republic of China 2011). Central level NGOs will play the following roles:

- **Information Sharing**

Central level NGOS will pioneer information sharing by first establishing online information sharing platforms (Chu 2015). Throughout the two case studies, it was evident that information is a powerful tool for disaster preparedness, planning, response and recovery. For example in Taiwan, the Morakot typhoon resulted in unnecessary deaths mainly due to the delays caused by inefficiently relayed information (Hung & Chen 2013). In a similar manner, the delays in communication caused by the bureaucratic system led to an inefficient disaster response system. The establishment of central level NGOs would facilitate the efficient collection and sharing of information through the network of 300,000 members in China and 50,000 members in Taiwan.

The central level NGOs shall utilize technological development to enhance communication and coordination before, during, and after disasters. These technological developments will include the use of the internet through social media platforms like Twitter, Facebook and Instagram as well as through satellite communications (Tsai and Liu 2015). The mode of communication will be through the organizational local area

network and virtual private networks which shall provide access to real-time information. These central level NGOs can then share information with government agencies and other NGOs. Such arrangements would improve the communication process and promote better coordination between the government and NGOs (Zschau and Kuppers 2013).

The online dissemination of information shall play a crucial role in the development and implementation of disaster preparedness programs that rely on early warning systems (Glyn et al. 2012). Additionally, when there is a distress call, these online platforms will have the capability to integrate location systems to create the profile of a disaster. The information provided by central level NGOs will be useful for the armed forces and registered rescuers during a disaster.

Another crucial aspect of the proposed communication process among central level NGOs would be the use of social media to conduct data mining (Wattegama 2014). The data obtained from social media platforms would be critical as it would represent the voice of the public and thus convey public knowledge. The popularity of social media in conveying breaking news has become very popular in the 21st century. These online platforms established by central level NGOs will utilize the relevant data from these websites to improve their disaster management efforts (Kuhlicke 2013).

- **Coordination between NGOs and the Government**

These central level NGOs will serve as connectors between local NGOs and the government. These local level NGOs work in close contact with community members by identifying their needs and engaging in participatory development. While the Chinese and Taiwanese government agencies have administrative chains of command and standards of operations, the organisational structures of NGOs are loosely organised thereby allowing a more efficient disaster response (Eriksen 2003). In coordinating the

operations of NGOs and the government, central level organisations will allow capacity building, advocacy and the distribution of resources to the affected areas.

Advocacy will involve the creation of awareness about major legislative issues as well as the strategies that should be improved to ensure better disaster management (Lei, Yue, Zhou & Yin 2014; Wenger 2014). The local level NGOs will convey information about critical policy issues to the central level NGOs thus promoting better advocacy in government policy. Additionally, these centre level NGOs will consult with the Taiwanese and Chinese governments in the development of clear guidelines (Tsai & Cheryl 2010). These guidelines will serve as clear procedures for relief operations to guide the relationship between the governments and NGOs and prevent conflict.

The NGOs will be involved in capacity building initiatives that supplement government efforts. The national government works in collaboration with the disaster response teams to facilitate the knowledge transfer to the community members (Edele 2009). The central level NGOs will initiate education programs that local NGOs can implement to improve the communities' disaster response skills. The facilitation of NGOs will streamline the unstructured administrative channels in Taiwan by creating a focal point for organising a disaster response (Tsai & Cheryl 2010). These NGOs will determine the skill profile of the communities and create a common platform for planning capacity building initiatives (Tseng & Chen 2012). This coordination will allow the local NGOs to facilitate the communities' access to education materials, to offer guidance, and monitor and evaluate their capacity relative to their vulnerabilities.

The facilitation of the coordination between the government and NGOs in the framework shall be implemented through the mobilisation and distribution of aid resources. The Taiwanese and Chinese Emergency Response Plans stipulate the importance of providing humanitarian aid to the vulnerable and the victims of disasters (Blaikie et al. 2014; Li et al. 2014). However, these resources are scarce and these NGOs could play a crucial role in coordinating the acquisition of supplies and

facilitating needs based distribution within communities. Therefore, the incorporation of these NGOs' efforts in the current response plans would improve efficiency and prevent the duplication of efforts (Edele 2009). The coordination of the efforts between the central government and the NGOs will thus ensure that the scarce resources are well utilised throughout the wider society.

- **Supervision of Local Level NGOs**

The local level NGOs will serve the purpose of providing information and support to the centre level NGOs which work in partnership with government agencies in providing humanitarian aid. However, these local NGOs need to be accountable in their activities. For example the communist and Buddhist systems in China and Taiwan respectively oversee NGO activities. In China, there are very strict registration policies that limit the inflow of local NGOs and regulate their operations (Edele 2009). Centre level NGOs should thus monitor and evaluate the activities of local level NGOs through the establishment of standard codes of operations.

Additionally, the creation of open forums for consultation between the centre and local level NGOs will help serve as a gateway for ensuring that local level NGOs comply with the government's regulations. These forums would facilitate the implementation of regulations that compel all local NGOs to forward their operations' progress reports and audits when called upon to do so.

- **Serve as Humanitarian Relief Headquarters**

The central NGOs will serve as the headquarters for humanitarian support which will enhance disaster preparedness and planning. Through their ability to maintain a profile of all disaster response activities, these NGOs are better placed to coordinate

humanitarian relief (Li & Feng-Tyan 2008). For example, the central NGOs in Taiwan will effectively gather information related to the Yuan and determine the regions that require more humanitarian aid than the others. This information shall be useful in the equal distribution of relief to the victims (Day et al. 2012).

Central level NGOs would work collaboratively with the government and this structure would in turn improve the accountability for the available resources. A common chain of command would serve to coordinate a disaster response (Buck, Trainor & Aguirre 2006). The establishment of headquarters at the central level would ensure that aid is dispatched and distributed in a manner that prevents the duplication of efforts (Martin et al. 2014). With the central level NGOs as headquarters, the control systems would be unified and consultative to allow the monitoring of the progress of the community response and relief programs. According to Day et al (2012), these NGOs will be wholly responsible for coordinating the networks and the humanitarian activities to ensure they are run effectively.

- **Performing the Relief Work**

Despite heavily relying on local NGOs in the implementation of community relief work, the central NGOs will directly provide communities with humanitarian assistance (Day et al. 2012). The organizations shall provide aid supplies, support evacuation efforts, and facilitate psychological and emotional support in addition to post-disaster reconstruction (Edele 2009). The many organizations under the unified central level NGO administration would possess different skills and resources. In the community area of their operations, these institutions shall offer a response to disasters within their areas of jurisdiction (Day et al. 2012; Li et al. 2013). In addition, they shall also access assistance from the centralized administration of the central NGOs to cope with disaster events.

Furthermore, the central NGOs within the communities shall work collaboratively with the government authorities in disaster management (Kuhlicke 2013). Duplications of activities can be averted when these organizations work together with the government in the planning and implementation of disaster management (Cozzolino 2012). In Taiwan, NGOs like Tzu Chi can work with the provincial, municipality, City and county, Township or Village administrative units in offering the affected communities relief (Tzu Chi 2011). In China, the central NGOs shall work with the already unified; State Councils, Provincial, City and County level relief centres. With the establishment of working relationships and networks among community members, the government and NGOs, the efficiency of relief activities will be optimized.

10.1.2.2 Local Level

Local organizations will supplement the work of central NGOs and implement their programmes at the community level. They will serve as an important link between the community, the central NGOs, and the government. These local level NGOs will have two main functions:

- **Carry out relief work**

The primary responsibility of local NGOs will be the implementation of the relief work in the community. The current NGO budget is limited but these NGOs shall operate efficiently to establish the needs of the communities (Day et al. 2012). Due to budgetary constraints these NGOs will focus on priority issues like preparedness, response, recovery, and reconstruction according to their organisational capacity. These NGOs provide a good base for conducting community risk and post disaster assessments (Blaikie et al. 2014; Duran, Ergun, Keskinocak & Swann 2013). The information

derived from these initiatives will significantly guide the implementation of disaster planning.

These local level NGOs shall also be involved in community capacity building and empowerment. Through community based organizations the dissemination of information, skills development and community organizing can be achieved. The local NGOs foster participatory development and empower community members and leaders to establish more resilient societies (Duran et al. 2013; McDaniels et al. 2015). The relief work provided by the Local NGOs fosters greater community involvement in responding and recovering from disasters.

- **The Work of Support Centre NGOs**

In the integrated NGOs framework for disaster management in Taiwan and China, the local NGOs shall provide strategic support to the central NGOs (Zhou and Yin 2014). The scope covered by the central NGOs will be wide and will involve comprehensive coordination among governmental and non-governmental agencies (Day et al. 2012). Working with community based organizations will seek to create a strategic platform for sharing information. Central organizations shall rely on the local organizations for information on the implementation of humanitarian aid in addition to the monitoring and evaluation of the impacts of community response initiatives (Day et al. 2012).

Local NGOs shall also support centre NGOs in establishing grassroots advocacy initiatives geared towards policy improvements and the creation of community awareness (Duran et al. 2013). As a result, they will contribute towards the important disaster related agendas in government policies. The combination of community resources would allow the local NGOs to ensure that the government and central NGOs jointly implement these improved resource mobilization initiatives (Glyn et al. 2012).

The locating of personnel and the coordination of the logistics of supplies by the central NGOs will be substantially simplified with the aid of the local NGOs.

10.2 Inclusion of the Humanitarian supply chain in the Emergency Plan

Inclusion of humanitarian supply chain cycle into emergency plan

1. Add humanitarian supply chain cycle (basic 5) into emergency plan
2. Set up regulations which requires the leading NGOs use the same information sharing system when disaster occur (Cluster Coordination)
3. Regular cross-training from both government and NGOs humanitarian supply chain departments

Figure 10.2: Summarized recommendations

The two governments of China and Taiwan should include the humanitarian supply chain in their emergency plans because such a supply chain is crucial to the successful implementation of a disaster response plan (Cozzolino 2012). The presence of a humanitarian supply chain in the emergency plan will reduce the inefficiencies experienced in the distribution of supplies in the areas affected by disasters (Duran et al. 2013; Kovács 2012). Essentially, both Taiwan and China rely on public donations and government appropriation to procure supplies for community assistance. However, these procurements may at times be inefficient or inconsistent making the process complicated. As a remedy to the current situation, establishing a humanitarian supply chain will ensure a more systematic approach to the delivery of supplies (Cozzolino 2012).

For example, the China Red Cross uses an official supply chain coordinated by the government and the NGO itself (Kovács 2012). However, the organization lacks autonomy from the state agencies making it reliant on the government's consent in

some phases such as the unloading and distribution of supplies. Conversely, the Taiwanese supply chain is more disorganized and only involves voluntary agencies and individuals who provide assistance. In the case of Tzu Chi in Taiwan, the community relies on the philanthropy of the members and volunteers to facilitate the delivery and distribution of supplies to the community.

Therefore, radical improvements are required in restructuring the management of the humanitarian supply chain in these countries (Day et al. 2012). Day et al. (2012) further explain that the organization of the supply chain should be based on the administrative structures of the central and local level NGOs in collaboration with the government. Community based organisations and national level NGOs enjoy a higher degree of impartiality and acceptability in the community. Structuring humanitarian supply chain management that is based on the structure would ease the process of dispatching supplies to the many affected areas (Day et al. 2012; Duran et al. 2013). The procurement of supplies should be conducted by the central level NGOs who mobilise resources from the communities, and government appropriation as in the case of the China Red Cross (Zhang et al. 2014). The organization should organize their activities independent of government efforts for the sole purpose of accountability. However, consultations with the governments should be facilitated to avoid the duplication of efforts.

Concerted efforts should be made to ensure that the central level NGOs mobilise resources, procure and deliver supplies to the appropriate areas based on their established networks (Duran et al. 2013). Local level NGOs can participate in the unloading and distribution of the resources from the drop off points. These efforts shall be directed towards supplementing but not substituting government supply chains (Natarajarathinam, Capar and Narayanan 2009). Where appropriate, the government can outsource its distribution to the central level NGOs based of clearly stipulated guidelines and accountability procedures. With the incorporation of efforts from both the local and central level NGOs and the government, a reliable and seamless

humanitarian supply chain will be established (Kovács 2012). In addition, measures of accountability will be created to ensure that the distributed supplies are well utilized. Establishing an oversight body to monitor and evaluate the supply chain activities will be key to promoting transparency and accountability (Day et al. 2012; Kovács 2012). The relationship between the government and the NGOs should also be checked to ensure that the government does not interfere with the impartiality of the non-profit organisations (Duran et al. 2013). These efforts can only be achieved by integrating the policies in the legislative provisions through advocacy and strategic lobbying (Glyn et al. 2012).

According to these recommendations, emergency planning and the emergency plan, the humanitarian supply chain and disaster response will all be improved, and the government and NGO cooperation will be relatively improved. Thus, the government and NGOs could carry out disaster relief more efficiently and effectively. Moreover, these recommendations can be applied to every single country worldwide.

Chapter 11 Conclusion

11.1 Introduction

This study has focussed on how to enhance the effectiveness and efficiency of a disaster response. It has examined in detail how an emergency plan is implemented in a disaster response, and the response by the governments and NGOs to a disaster in China and Taiwan. This chapter details the main contributions of this research, provides a discussion of its limitations, and then gives some recommendations for further research.

11.2 Contributions

This research makes several claims for contributions to knowledge. First, in most of the research focused on improvements to the humanitarian supply chain in order to enhance disaster response, the majority of researchers (Wassenhove 2006; Oloruntoba and Gary 2006; Balcik 2015 and 2017; Christopher, Martin and Tatham 2014; Tomath 2014) have had a supply chain management background. However, this thesis will examine disaster response from both the emergency planning and humanitarian supply chain perspectives. Due to the uncertainty and unpredictability of disasters, improving the humanitarian supply chain alone will cause the theory and practice to not match. Thus, it is necessary to improve and enhance the humanitarian supply chain, taking into consideration the uncertainty and unpredictability of disasters, while also improving emergency planning. Moreover, none of the previous studies on this topic so far have recognized or acknowledged the importance of emergency planning.

Secondly, this study contributes to knowledge in terms of both the literature and the practice of disaster management. This research is the only academic resource that has

addressed the disaster response, emergency planning, and the humanitarian supply chain at the same time. This study uses the qualitative approach to examine DM, particularly emphasising the new trend to study the disaster response combining both emergency planning and humanitarian logistics. It is unique and creates a new direction for future research.

The third contribution of this study is that it guides new directions for future research. This is not the end of research in this area and a number of new research questions are proposed based on the findings of this study.

11.3 Review of the research aim and objectives

Before entering into a discussion of the main conclusions drawn from the findings of this thesis, it is timely to recall the original research aims and objectives that were set out at the beginning. In Chapter 1, it was stated that the primary aim of the research was to examine how to enhance the effectiveness and efficiency of a response by governments and NGOs to a disaster and thus the research objectives were proposed as follows:

- Critically examine the disaster management framework and emergency planning
- Explore the key factors and challenges in humanitarian supply chain management
- Examine and evaluate the effectiveness and efficiency of government emergency planning and humanitarian supply chain management in the case studies of the Wenchuan Earthquake (China) and Typhoon Morakot (Taiwan), and use a comparative approach to evaluate both case studies
- Provide recommendations to enhance disaster responses in the future

The research objectives were focussed on guiding the research, closely linked to what has been discussed throughout the thesis. First, Chapter 2 examined the disaster management framework and emergency planning. Chapter 3 explored the key factors and challenges in humanitarian supply chain management. Chapters 7 and 8 examined and evaluated the effectiveness and efficiency of government emergency planning and humanitarian supply chain management in the case studies of the Wenchuan Earthquake (China) and Typhoon Morakot (Taiwan), and used the comparison approach to evaluate both case studies. Finally, Chapter 10 provided recommendations to enhance future disaster responses.

11.4 Suggestions for future research

In terms of disaster management, due to the limitations of the research method used in this study, a large-scale survey on disaster responses by governments and NGOs was not conducted. This might be helpful for breaking down the barriers in the collaborations between governments in terms of disaster response.

Moreover, standardizing the humanitarian supply chain process could become a very big issue in future emergency planning. Currently, scholars with a supply chain background are not very much involved in emergency planning, thus this might be a new area for research in the future.

Finally, an information and resources sharing platform between a government and NGOs in the emergency planning context is crucial during a disaster response. The United Nations currently uses a cluster as a sharing platform to help eliminate information asymmetry, reduce the duplication of work, and reduce the waste of resources.

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Appendix 1: Emergency Planning principles

In General principles (13)

- Emergency planning is an important activity for many kinds of organization and many different areas of jurisdiction;
- Emergency planning is a multidisciplinary process that cuts across the boundaries of professions and disciplines;
- Emergency planning should strike a balance between providing detail and ensuring that its structure is clear to the users;
- Emergency planning focuses on what to do during the emergency period of a disaster/crisis, it has a role to play in all the other phases;
- Emergency planning is about helping to create a common language and culture, and common objectives, for the organizations and people who respond to emergencies;
- Information technology increases the opportunities for collaboration and reduces the need for a hierarchy. It therefore tends to flatten the chain of command;
- Higher levels of government should co-ordinate and harmonize the role of local civil protection authorities;
- Emergency planning should focus primarily on satisfying the urgent needs of the plan's beneficiaries;
- The process of emergency planning is as important as the end product;
- Emergency planning should be one approach among a series of structure and non-structure measures designed to reduce the impact of disasters. It should be integrated with the other approaches;
- Emergency planning should seek to ensure that local communities affected by crisis or disaster are able to regain their autonomy. It should seek to discourage dependency on outside assistance;

- Emergency planning should be a participatory process that positively involves, not excludes, the organizations it refers to;
- Emergency planning must be an inclusive process that does not omit or ignore any group which might require special assistance;

Emergency planning process (15)

- An emergency plan should be a 'living document' that is kept up to date and is familiar to its users;
- Emergency plan should be written to cope with both known and unknown hazards;
- Emergency plans are part of the process of creating resilience and must therefore promote both robustness and the adaptability of society in the face of hazard;
- Emergency plans should be acceptable to all their users to function well;
- An emergency plan is the instrument by which urgent needs are matched with the resources available to satisfy them;
- The purpose of an emergency plan is not to provide basic procedures but to co-ordinate the activities of the forces that have their own emergency response procedures to follow;
- Emergency planning should not be restricted to the formulation of a permanent plan, but should also be conducted on a forward basis during an emergency situation by planning the imminent strategic, tactical and operational responses;
- All hazard emergency planning is the most efficient kind. A plan should include detailed provisions for hazards that are common in the area of its jurisdiction and generic ones to cover unexpected threats;
- Emergency plans should be formulated by people who have both theoretical training in disaster management and practical experience of dealing with crises;
- A single agency, and its head, must take responsibility for the emergency plan on behalf of all people and organizations that will use it.

- Because emergencies (of any scale) are essentially local problems, the municipality is the basic, or 'bedrock' level of emergency planning;
- Emergency plan should be create a clear, unambiguous structure of decision-making, command, operations and the division of responsibility;
- Emergency plan should help create a common operating picture of conditions on the ground. It should do so by ensuring that emergency managers constantly acquire, evaluate and share information from the field;
- Emergency plan should encourage interoperability between different services and response organizations that must work together in crisis situation;
- A good emergency plan will include provisions to keep the general public properly informed of developments in the emergency and response, and of any actions that the authorities require of citizens;

Scenario building (5)

- The scenario is a useful tool for investigating what might in an emergency and what responses might therefore be needed.
- Lessons are learned when they result directly in measurable changes for the better. Registering and recording experience does not necessarily result in lessons learned unless the lesson is enacted in the form of some positive change in working practices.
- The scenario is a model of reality and, like all good models, it should elegantly simplify a complex situation to the ingredients that are most important for the uses to which the scenario will be put.
- Scenario are only appropriate where enough data exist for a creditable account of the risk situation to be prepared.
- The scenario methodology should produce a range of outcomes, representing the envelope of possibilities for the impact of a hazard under the range of different conditions that is expected to occur in the affected area.

Third step: From scenario to actions (5)

- The emergency plan should help create a common operating picture of conditions on the ground. It should do so by ensuring that emergency managers constantly acquire, evaluate and share information from the field.
- The emergency operation centre (EOC) is the 'nature home' of the emergency plan, where it can most easily be formulated, maintained, disseminated and utilized.
- Emergency plan should encourage interoperability between different services and response organizations that must work together in crisis situations.
- A good emergency plan will include provision to keep the general public properly informed of developments in the emergency and response, and of the actions that the authorities require of citizens.
- Messages to the public and mass media need to be clear, concise and univocal.

Fourth steps: using the plan (8)

- No participant who works under the jurisdiction of the emergency plan should be without a role to play in the response to a crisis or disaster.
- Some of the provisions of an emergency plan should be tested periodically using crisis simulation exercises. Improvements to the plan should be derived from the results of these.
- In exercise design there is a trade-off between realism and pragmatism. No field exercise is likely to be fully realistic, but should provide a good simulation of the urgency and demands of the emergency environment.
- During field exercise, any significant threat to health and safety should be taken seriously and should lead to an appropriate response, which could be to halt

the exercise. It is permissible to make mistakes in an exercise providing there is no threat to health and safety and the appropriate lessons are learned.

- Exercises should always be carefully and objectively evaluated so as to produce a final report that details the lessons derived from the simulation.
- Planning does not end with the compilation of the permanent emergency plan. Instead, it should continue during emergencies, when it involves adapting the provisions of the plan to the requirements posed by the on-going situation.
- State of emergency should be declared as soon as the developing situation can no longer be managed adequately with normal resources (or preventatively in anticipation of this). At this point the emergency plan should be activated and all participating organizations should simultaneously switch to emergency mode.
- 'Stand-down' should be declared as soon as emergency response objectives have been met or are no longer appropriate and conditions are no longer threatening. This should automatically deactivate the emergency plan. Debriefing should follow.

Appendix 2: Criteria for Emergency Planning Standards

- i. The basic, or reference, level of emergency planning is that of municipal government.
- ii. The plan should be prepared by, or under the direction of, a qualified emergency planner.
- iii. There should be only one plan, not several, and it should be cover all likely hazards.
- iv. The plan should be written in clear, simple, unambiguous language.
- v. The plan should conform to the laws on emergency and disaster management that are in force in the country and region it pertains to.
- vi. The plan must be specific about the extent, limits and limitations of its jurisdiction.
- vii. The plan should seek to be fully compatible with plans and planning requirements at other levels of government and in neighbouring jurisdictions.
- viii. The first objective of the plan is to ensure that lives are not lost unnecessarily.
- ix. The second objective of the plan is to match urgent needs with appropriate resources in the most efficient and timely manner.
- x. The plan should be based on a careful and, as far as possible exhaustive, assessment of what is likely to happen when an emergency occurs in its geographical area of jurisdiction. It must be based on adequate basic research.
- xi. The emergency plan should take account of urban and regional planning provisions in effect in the area under its jurisdiction, especially regarding the hazardousness of place and the siting of critical facilities.
- xii. The plan should conduct and present the results of a full audit of the resources that will be used during emergency operations.
- xiii. Emergency planning should deal with processes, not merely quantities.
- xiv. The plan should adequately specify the roles and activities of each and every participant in the risk management and emergency operations activities it covers.

- xv. Whether or not an emergency plan concentrates on the early post-impact phase, it should take account in an integrated manner of all the phases of the “disaster cycle”.
- xvi. Activities described in the plan that are designed to combat disaster should include or at least facilitate sustainable measures for disaster prevention.
- xvii. The plan should seek to integrate and embrace provisions for the private sector, hospitals, industries, airports, etc.
- xviii. The plan should constantly be revised and circulated among its participants, and should be tested regularly.

Appendix 3: Interview protocol

Objectives/ timing	Questions
Introduction (5 mins)	<p>Nature of research and how will be used</p> <ul style="list-style-type: none"> • Research study aims to to investigate the methods to enhance the effectiveness and efficiency of the response by the government and NGOs to a disaster, by using the case studies of the Wenchuan Earthquake and Typhoon Morakot • Used in academic and publications, conference papers and a funders' report. • Recording for recollection purposes / quotes; • Anything said will be treated as confidential and anonymous/ your personal data will not be passed on to anyone else; • I'll nod a lot because I want to hear you, not me... • Think of this as an informal chat. I'm interested in your own reflections on your career. We want honest views and opinions about the topic. • So, before we start, please fill in the participant information sheet and consent form.
'Warm up' with basic personal information (10 mins)	<ul style="list-style-type: none"> • What is your title • How many years you involved in this humanitarian relief area • How many event you involved before and list the event
Starting with current emergency plan and humanitarian supply chain management (15 mins)	<ul style="list-style-type: none"> • How do you criticise current emergency plan? How does it affect deliver aid (positive or negative and why)? • Frame the structure of the existing humanitarian relief aid and humanitarian supply management in China;
Discussing about supply chain operation	<ul style="list-style-type: none"> • During the disasters response, how did the humanitarian supply chain system operate and

(20 mins)	<p>why?</p> <ul style="list-style-type: none"> • How is humanitarian supply management organized? And what part is played by the differently with instructions provided by emergency plan?
Effectiveness and efficiency of humanitarian supply chain (15 minutes)	<ul style="list-style-type: none"> • How can the humanitarian supplies chain become more effective and efficient? And how important is it to apply this in humanitarian relief work?
Coordination between NGOs and government during disaster response (20)	<ul style="list-style-type: none"> • In what ways do the authorities coordinate their efforts at the local and national levels? And are they really satisfied by the roles played by different authorities?
Challenges in humanitarians supply operation (15 minutes)	<ul style="list-style-type: none"> • What was the biggest challenge or challenges during the time of the disasters? Why? And how can these challenges be solved?
Any other relevant aspects not discussed (2 min)	<p>The discussion is coming to an end now, so:</p> <ul style="list-style-type: none"> • Is there anything we haven't talked about that you think we should discuss?
Finalise interview (5 min)	<p>Thank and close:</p> <ul style="list-style-type: none"> • Indicate whether they would like to receive preliminary report draft in order to provide feedback
100 minutes appx	

Appendix 4: Participant Information Sheet

Project title:

**Enhance the effectiveness and efficiency of government and NGOs disaster response
—case studies of Wenchuan Earthquake and Typhoon Morakot**

1. Information about the project/Purpose of the project

The aim of this research is to investigate the methods to enhance the effectiveness and efficiency of the response by the government and NGOs to a disaster, by using the case studies of the Wenchuan Earthquake and Typhoon Morakot.

This research has several objectives: firstly, provide definitions and critically examine the DM framework, emergency planning, and emergency plan; secondly, explore the key factors and challenges in humanitarian supply chain management; thirdly, compare the government emergency planning, the government's and NGOs' humanitarian supply chain management between the cases of the Wenchuan earthquake (China) and typhoon Morakot (Taiwan); and finally, to provide recommendations to enhance the effectiveness and the efficiency of a disaster response.

2. Why have I been chosen?

You have been chosen because you play/have played one of the following role: (1) Central government officer who has been involved in the humanitarian relief aid and humanitarian supply chain management; (2) Local government officer who has been involved in the humanitarian relief aid and humanitarian supply chain management; (3) NGO worker officer who has been involved in the humanitarian relief aid and humanitarian supply chain management;

3. Do I have to take part?

You do not have to take part in the project. However, your participation will help the research team to gain the first insight on the reconstruction programme and help use to achieve our research aims.

4. What do I have to do?

You will participate in a semi-structured interview which will last about 1 hour. You can choose to answer my questions or not. You can stop the interview at any time you like. If you feel that you don't like us to reveal the contents of the interview, you can tell us any time before we complete the research (the end of April 2016).

5. What are the risks associated with this project?

Although we will use anonymous to refer to our data collected from interviews, so your name will not be displayed in any of our future publications, for example, book chapters, conference papers, and journal articles, however as we will reveal the name of your organisation, if readers of the research are familiar with the work of the organisation, they might be able to recognise the view of individual interviewees. If you prefer not to take the risk, please let us know, we will make sure that the contents of the interview will not be used in our publication. If your role is at the national government, you might be identified, although pseudonym will be used.

6. What are the benefits of taking part?

No benefit at all. However we appreciate your time and enthusiasm to help us to provide recommendations to policy change and future post disaster reconstruction arrangement.

7. Withdrawal options

You can withdraw the interview at any time, starting from the time when I contact you, till I finished the interview. However, please let us know your intention before the end of August 2014, when we will submit the first report of the research. You could withdraw the interview, or let us know that you do not want us to publish the contents of the interview by emailing me

Content removed on data protection grounds

8. Data protection & confidentiality

All my participants are anonymous, that the participant can be identified by the researcher but access to this information will not go beyond the researcher. I will store your information, interview records in my phone, laptop and hard-drive with encryption. All records will be destroyed after we finish writing up.

9. What if things go wrong? Who to complain to

Content removed on data protection grounds

10. What will happen with the results of the study?

I will use the results of the interviews in my PhD dissertations; I will also write up to publish in academic journals. I will make presentations in conferences.

11. Who has reviewed this study?

Coventry University only.

12. Further information/Key contact details

Content removed on data protection grounds

Appendix 5: Interview consent form



<ul style="list-style-type: none"> PROJECT TITLE: Enhance the effectiveness and efficiency of government and NGOs disaster response—case studies of Wenchuan Earthquake and Typhoon Morakot 	
<ul style="list-style-type: none"> STATEMENT: <i>The undersigned hereby consent to participate in an electronic recorded interview for the express purpose of contributing to the research programme of the interviewer listed below. This statement confirms that the interview will adopt an ethically appropriate manner that will do no harm to the participant, the respective organisations, society or the interviewer and will conform to the Coventry University ethics statements listed below.</i> 	
Please Tick	
1. I confirm that I have read & understood the participant information sheet for the above study and have had the opportunity to ask questions.	<input type="checkbox"/>
2. I understand that my participation is voluntary & that I am free to withdraw at anytime without giving a reason.	<input type="checkbox"/>
3. I understand that all the information I provide will be treated in confidence	<input type="checkbox"/>
4. I understand that I also have the right to change my mind about participating in the study for a short period after the study has concluded (31 st July 2015).	<input type="checkbox"/>
5. I agree to be recorded as part of the research project	<input type="checkbox"/>
6. I agree to take part in the research project	<input type="checkbox"/>
INTERVIEWER <ul style="list-style-type: none"> Name: Signature: Date 	PARTICIPANT: <ul style="list-style-type: none"> Name: Signature: Date

Appendix 6: Government response in first seven days in China

	Government disaster response actives	Centre/Local
May 12		
14:28	Wenchuan County (31.0 degrees north latitude, 103.4 degrees east longitude) experiences a strong earthquake. Chinese Earthquake Networks Centre initially identify this as being Richter 7.8.	Both
14:51	The Sichuan Seismological Bureau sends a working group to the first scene, which goes to work in the quake zone.	Local
15:00	Hu Jintao provides important instructions requiring the rescue of the wounded as soon as possible to ensure the safety of people in disaster areas. The local military and armed forces carry out the rescue task, becoming the first team to appear at the disaster scene.	Centre
16:00	Prime Minister Wen Jiabao takes a helicopter and rushes to the disaster area to guide the disaster relief work.	Centre
16:16	The State Seismological Bureau launches The A Level Plan that assembles a rescue team consisting of 180-members, ready to support the disaster relief.	Centre
19:10	Prime Minister Wen Jiabao as commander of the earthquake relief headquarters, heads to the Wenchuan County earthquake disaster site.	Centre
20:00	Arba Armed Police Corps detachment dispatched to the Wenchuan disaster area.	Centre
20: 02	Two air force il-76 military transport planes take off from Beijing Nanyuan airport, transporting 175 people to the disaster area.	Centre
21:42	Prime Minister Wen Jiabao arrives in the earthquake-stricken city of Dujiangyan to begin directing the relief work. This requires PLA officers to overcome all the problems of the quake-hit roads, telecommunications, power outages, and travel to the most affected areas as quickly as possible.	Both

22:00	National Earthquake emergency rescue team arrives in Chengdu by Il-76 military transport aircraft.	Centre
22:03	Chengdu Military urgently dispatches more than 6,100 soldiers to the disaster area to participate in the earthquake relief.	Local
22:15	National Earthquake Disaster Emergency Committee starts its disaster emergency response.	Both
22:50	Sichuan Province earthquake relief headquarters announce 8,533 casualties so far.	Local
23:40	Prime Minister Wen Jiabao holds the Earthquake Relief State Council meeting in a makeshift tent in Dujiangyan to analyse the current situation of the earthquake relief, and decide on the next deployment.	Centre
23:55	General Secretary Hu Jintao chairs the evening Politburo Standing Committee meeting and sets out the full deployment of the current relief work.	Centre
May 13		
00:00	Four military helicopters sent by the Chengdu military air force to the quake-hit Wenchuan county in Sichuan province forced to return to sea due to severe weather conditions. It was raining heavily.	Military
00:15	The third military medical university emergency medical team sent to Sichuan. The medical team arrives in the first line of the disaster area in Deyang, Sichuan province.	Both
00:23	Following the temporary closure of Chengdu Shuangliu International Airport, it is opened again.	Both
01:15	The first contact is made through satellite phone. The county Party Secretary Wang Bin told that there are more than 30,000 people living in shelters and afraid to go home. From the epicentre of Yingxiu, Xuankou, Wolong there is still no news and transportation is completely interrupted.	Both
03:24	Armed Forces deployed consisting of more than 13,000 soldiers to the disaster relief.	Military

07:00	Prime Minister Wen Jiabao holds a meeting of the State Council earthquake relief headquarters again, and emphasizes that the roads leading to the epicentre of the disaster area must be clear before midnight.	Both
08:30	After relief work, Beichuan county seat makes contact with the outside world.	Local
09:00	People's Liberation Army General Staff Department order the Jinan military region of the mechanized infantry division, consisting of 10,000 troops, to participate in the disaster relief team by air transportation.	Military
10:00	Over 6,000 blood bags from Beijing transported to the airport, to support the Wenchuan earthquake.	Centre
20:30	Earthquake Relief Headquarters of the State Council hold a meeting on a train. Wen Jiabao says the current core mission continues to be rescue relief.	Centre
23:15	200 people from a division of Sichuan Armed Police, undertake a forced march 90 km from Lixian County to Wenchuan County. They become the first of the Wenchuan relief team to reach the County.	Military
	In the morning, the Remote Sensing Centre of the National Ministry of Science and Technology send aircraft to the Sichuan earthquake disaster area.	Centre
	The day after the full repair of the railway sector, apart from the Baocheng line, the other line is fully restored.	Both
May 14		
06:19	The first batch of railway transport relief supplies arrive at Chengdu East Railway Station.	Both
10:00	Premier Wen Jiabao goes to the scene of Beichuan Secondary School. He emphasizes the most important task is to try to rescue the survivors as best they can, even if there is one percent of hope, there must be 100% effort.	Both
12:20	15 paratroopers successfully parachute into Mao County	Military
14:55	Relief supplies donated by the Russian Government arrive in Chengdu.	Centre
In the afterno	Premier Wen Jiabao rides a military helicopter to observe the destruction in Wenchuan and Yingxiu, and then flies back to Chengdu.	Centre

on		
In the evening	Premier Wen Jiabao holds a meeting on the train heading from Chengdu to Guangyuan City. He decide to add 90 helicopters to the disaster area for emergency relief.	Centre
	The people's Liberation Army General Staff Mapping Agency organizes relief mapping support operations, preparing publication of the "special relief map" during the night, which is urgently sent to the disaster area.	Military
May 15		
02:22	Air Force Il-76 transport aircraft drop 5 tons of food, medicine and other relief supplies to the people in the disaster areas. This is the first successful implementation of China's armed forces on the night cloud drop.	Military
13:55	China Telecom fixes all telecommunications, including mobile phones, landlines, and broadband.	Local
17:00	About 110 tons of relief supplies arrive at Chengdu Shuangliu Airport.	Centre
20:00	Ministry of Civil Affairs allocates a total of 127,580 earthquake disaster relief tents, 220,000 relief duvets, and 170,000 cotton jackets.	Military
20:30	1,800 soldiers walk into the hardest hit town-- Yingxiu.	Military
21:30	With the success of previous blasting, construction workers fight more than 70 hours to completely reopen State Road 317 which was at the direct epicentre of the Wenchuan west line channel	Local
May 16		
10:30	CPC Central Committee General Secretary and State President and CMC Chairman Hu Jintao arrives in Mianyang. Encourages cadres and the masses to visit the earthquake relief frontline troops and medical staff. Premier Wen Jiabao goes to the airport to greet Hu.	Centre
13:05	President Hu Jintao arrives at the Beichuan rescue scene.	Centre
15:30	Japanese rescue team arrives in Qingchuan County and start rescue work immediately. This is the first time that the Chinese Government has accepted foreign aid after a devastating natural disaster. Russia, South Korea, Singapore	Centre

	also send professional rescue teams on the same day in the afternoon, and in the evening arrive in Sichuan, and immediately rush to Mianzhu, Shifang City which were the hardest hit.	
17:00	Hu Jintao arrived at the Beichuan Middle relief scene. In front of his People's Liberation Army, police officers, firefighters, rescue workers and other militia, he says: "you are worthy of the people's army."	Centre
18:00	The Railway Department opens the 230 'relief supplies train' line, to transport rescue machinery, food and medicine, and other military and civilian emergency relief supplies over 2,400 times, have received 837 time so far. Currently, a large amount of emergency supplies are on the road.	Both
May 17		
Minorin g	President Hu Jintao arrives in Wenchuan County, checks the disaster situation and guides the relief work.	Centre
21:30	State Road 213 and province highway 302 are opened up, indicating that the road repairs are complete.	Local
May 18		
	The State Department announces that from 19 th -21 st May 2008 are special national days of mourning. The Chinese Seismological Bureau revises the earthquake magnitude from 7.8 to 8.0 Richter.	Centre

Appendix 7: Government response in first 15 days in Taiwan

2009	
04/08	Taiwan's Central Weather Bureau forecasts the formation of typhoon Morakot, and predicts that in Taiwan north and east there will be a few showers (United Evening News, 2009).
05/08	Taiwan's Central Weather Bureau issues a typhoon warning, the level is a medium-strength typhoon, emphasizing that Morakot is the biggest threat from a Taiwan typhoon this year (United Evening News 2009).
06/08	Taiwan's central weather bureau predicts super heavy rain (United Evening News 2009); The Central Emergency Operation Centre issues an alert, upgrading to Level 1 (United Evening News 2009); The Head of the Executive Yuan, Mr Liu gives instructions to the relevant government departments, emphasizing that special attention be given to floods (United Evening News, 2009).
07/08	The Central Disaster Response Centre reports that rain and storms will turn big in the southern area that night, the highest rainfall will be 1400 mm and it alerts the five Heads of Counties in central and southern areas to evacuate the residents who live in mudslide warning areas immediately. The Response Centre notes that the withdrawal rights are reserved by local governments, not the central government (United Evening News, 2009).
08/08	The Soil and Water Conservation Bureau, Council of Agriculture, announces a mudslides Red Alert, for a total of 11 counties including 37 towns, 131 villages, and 297 rivers (United Evening News 2009); The Water Resources Agency, Ministry of Economic Affairs considers requesting more pump support (United Evening News, 2009); The Central Disaster Response Centre of Executive Yuan, reports that the Defence Department has instructed and deployed Eighth Army troops to go to the Kaohsiung-Pingtung area for support. The Department of Defence stresses that regional grouping garrison support units are also on standby, if necessary, they can dispatch the relief ordered within 10 minutes (United Evening News 2009); The Local Central Disaster Response Centre starts to respond (United Evening News 2009).

09/08	<p>The Central Disaster Response Centre announces casualties: 3 dead, 31 missing, 19 injured, and 6,301 people evacuated (United Evening News, 2009). After one night, the disaster situation in Nantou County becomes serious. President Ma Ying-Jeou instructs Taipei City Fire Department to request rescue rubber dinghies to support the South;</p> <p>President Ma Ying-Jeou also indicates that the Centre Government is going to establish Disaster Response Centres in the southern areas in order to conduct rescue and relief work (United Evening News, 2009).</p> <p>Head of Executive Yuan Mr Liu goes to the south disaster site Pingtung and takes command of the relief in the Kaohsiung and Pingtung areas (United Evening News, 2009).</p>
10/08	<p>Military helicopters enter the Kaohsiung County disaster site (United Evening News, 2009);</p> <p>In the afternoon, military Special Operations Forces enter the Xiaolin village by helicopter to rescue the surviving villagers. Kaohsiung City Disaster Prevention Centre is renamed Disaster Support Centre in order to utilise human resources, and supply assistance to neighbouring counties (United Evening News, 2009);</p> <p>During the coordination in the response and relief work, the information does not flow well between the local and central government. The Ministry of Interior sets up Relief Centres in the southern Pingtung Police Department, as a support window (United Evening News, 2009);</p> <p>Military amphibious vehicles cannot enter the Jiadong Township in the Pingtung area, because the rubber boats are often punctured by fishing gear which cause the evacuation to be extremely slow (United Evening News, 2009);</p> <p>President Ma Ying-Jeou visits the disaster area in Taitung and instructs on the relief pattern which was "response by local, support by central" in order to allocate resources reasonably and equally (United Evening News, 2009);</p> <p>President Ma Ying-Jeou indicates that rescue and relief is the most important task, stressing that the Government will do its best to do the response and relief work;</p> <p>Government staff claim the response and relief work still belongs to the government disaster level, but they also do not have to start the national security mechanism (United Evening News, 2009);</p> <p>Steps for Disaster: 1. the establishment of the Central Disaster Response Centre; 2. Repair utilities, bridges, roads, and telecommunications; 3. Evacuation, relocation of the villages, changed into a kind of relief aid. After the Centre disaster prevention conference on disaster judgment, inform the local standard operating procedures to</p>

	undertake no practical work (United Evening News, 2009).
11/08	<p>The Central Disaster Response Centre state that the Executive Yuan has drawn up a "Post-disaster Recovery Typhoon Morakot Reconstruction Relief Plan," the decision refers to 921 earthquake victims, relief aid to dying or missing people - \$1 million New Taiwan Dollar (NT), 250,000 for the injured (United Evening News 2009);</p> <p>The Army Force rescues 10 people and identifies 150 stranded people, also airdrops 1,300 kg of supplies which includes delivery of a variety of materials (United Evening News, 2009);</p> <p>Disaster relief command system scheduling-Mr Liu Xuanan the vice president of administration in the north area, instructs the Head of the Ministry of the Interior Mr Liao and the response for the south area. This requires various intelligence units to report any information to him straight away, in order to facilitate the latest disaster information and progress, such as scheduling and processing in accordance with subsequent relief matters (United Evening News, 2009);</p> <p>Presidential Office reports that the existing relief mechanism can be implemented first and does not consider activating the National Security Mechanism or Emergency Command (United Evening News, 2009).</p>
12/08	<p>President Ma Ying-Jeou undertakes an in-depth exploration of the disaster stricken areas, it is the first time that President Ma has visited the disaster area in Pingtung (United Evening News, 2009);</p> <p>In response to the disaster relief, the Executive Yuan Spokesman reports that it does not exclude issuing the Emergency Orders (Ji Jing Daily, 2009.08.12, A4 version);</p> <p>President Ma Ying-Jeou visits Jiadong Township in Pingtung County, he says, do not repeat the promulgation of the emergency orders, because the 921 Earthquake promulgated 11 earthquake emergency commands in the Disaster Prevention and Relief Act. If enacted again, the flexibilities and ranges would all be smaller than for the Disaster Prevention and Relief Act (United Evening News, 2009);</p> <p>There are many victims that are homeless even up until now, Premier Liu today instructs the counties report within 48 hours of the resettlement plan, and the central government will give the necessary support and assistance; for disaster rescue, Premier Liu authorizes Minister of the Interior, Mr Liao, that for some rescue equipment shortages he can mobilize requisitions (United Evening News, 2009);</p> <p>Ongoing search and rescue operations continue following Typhoon Morakot, with people trapped in Kaohsiung County. Kaohsiung County Fire Department takes a multipronged approach to advance to the disaster area on foot (United Evening News 2009).</p>

13/08	<p>The military army force sends out the seagull helicopter to conduct rescue and relief work;</p> <p>The military army force sends reinforcements of four thousand soldiers (United Evening News, 2009);</p> <p>Military receive orders to proceed in 10 minutes: Eighth Relief Corps responsible for operations in southern area; Tenth Relief Corps responsible for central area; Sixth Relief Corps responsible for the north (United Evening News, 2009).</p>
14/08	<p>President Ma Ying-Jeou convenes the National Security Council, the President proposes nine points, requires that the central and local reconstruction committees should be set, and the military should boost its relief efforts (United Evening News, 2009);</p> <p>President Ma Ying-Jeou holds the National Security Council Meeting today --disaster reconstruction mobilization meeting 7 days after Morakot has occurred (United Evening News, 2009).</p>
15/08	<p>Mr Liu held a news conference yesterday afternoon at the Central Disaster Response Centre and said that next Monday (the 17th) he will establish the Morakot disaster reconstruction committee, serve as chairman, and hold its first meeting. Next Thursday (the 20th) the Executive Yuan will send 'Morakot Reconstruction Special Regulations' to the legislative department as soon as possible (United Evening News, 2009);</p> <p>President Ma Ying-Jeou states there is the need to set up a reconstruction committee at this stage (United Evening News 2009);</p> <p>After the National Security Council Meeting, the Disaster Resettlement, Reconstruction and Recovery Plan is started today (United Evening News, 2009).</p>